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ABSTRACT

Presented is one of a series of resource guides designed to provide students with an improved mathematics program. This guide emphasizes hands-on experiences for secondary students through real-life situations focusing on measurement in the home. Students are provided with numerous opportunities to use both customary and metric units in applications to measurement in the kitchen and in connection with home furnishings, the cost of utilities, and general family finances. The bulk of this document is a collection of worksheets designed to help students through individual mathematics laboratory experiences. The intent is to provide teachers with materials and guidelines to structure a course that develops basic mathematical skills and concepts through application of "home laboratory" experiences. (MP)

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SELECTED MATHEMATICS APPLICATIONS (LEVEL B)

Measurement in the Home

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SE 033 925

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FOREWORD

In 1978 the Mathematics Program Guide, K-12 was developed and disseminated to all public schools in Hawaii "to provide direction for teachers and administrators in the development of school-level mathematics". One of the major outcomes of this effort was a substantial strengthening of the quantity and quality of the secondary mathematics program. Existing courses in grades 9-12 were restructured and several new courses were created. Selected Mathematics Applications (Levels A and B) is a series of new courses which are designed to emphasize development of basic mathematics skills and concepts in the areas of arithmetic, geometry, measurement, and problem-solving through application to "real-life" situations such as business, consumerism, industry, and the trades.

This document is one of a series of Selected Mathematics Applications resource guides. In this guide real-life situations using "measurement in the home" will provide students with numerous opportunities to develop an in-depth knowledge of mathematical concepts and skills in the aforementioned areas. Applications to measurement in the kitchen, purchasing of home furnishing, cost of utilities, and general family finances will furnish topics for these opportunities.

The intent of this resource guide is to provide teachers with guidelines and materials in order to structure a course that would teach students mathematical content through the application to "Measurement in the Home".

Charles G. Clark
Superintendent of Education

ACKNOWLEDGMENT

We gratefully acknowledge those teachers who critically evaluated the draft manuscript of this Guide. Their suggestions for improvement of the Guide are appreciated.

Special recognition is extended to Naomi Nishida, Beverly Oda, and June Oshiro, Mathematics Teachers, Waipahu High School, who developed and piloted the draft of this resource guide.

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INTRODUCTION

The major emphasis of this semester course is to give the students hands-on experience in measurement using both customary and metric units. The applications found in the units deal with practical, everyday activities in the home. It is hoped that the student will review and strengthen his/her basic arithmetic skills through these activities.

The assumption of this course is that the student is fairly competent in the four basic operations involving whole numbers, fractions and decimals. As you go through each section, you may adjust and adapt the activities to meet the needs of your students. The learner objectives listed for Option X, Level A courses (pg. 122-123, Mathematics Program Guide) can be used for review objectives. The supplementary exercises listed can be used to provide additional practice to achieve the objectives.

The use of the calculator is becoming more prevalent in mathematics classes and in the home. It is recommended that the calculator be incorporated into the course whenever possible to check answers and to reinforce concepts rather than for computation.

The following is a recommended schedule:

Measurement in the Kitchen	7 weeks
Measurement in Home Furnishings	6 weeks
Measurement in Utilities	2 weeks
Family Finances	3 weeks

You may make adjustments to satisfy the needs of your students.

Quizzes and tests should be administered at regular intervals to check on students' progress. A recommended pre-test can be found in CONSUMER AND CAREER MATHEMATICS, on pages T41-48 in the Comments to the Teachers. (See Appendix A.)

Many outside sources can be incorporated into this semester course such as the supermarket, utility companies, and financial institutions. Most of the sources have educational departments that can provide films, filmstrips, and speakers, as well as printed material for use in the classroom. Field trips can be arranged to a variety of places. There are no limits to the course; let your imagination go.

This resource guide is divided into four units. Each unit is then divided into sub-units. Each sub-unit begins with its objectives, comments, and activities in an outline. The outline is then followed by sample activities which are reproducible.

I. Measurement in the Kitchen

A. Measuring with Customary Units

1. Measuring

a. Objectives

1) Uses containers off the retail shelf to measure quantities.

2) Knows the appropriate abbreviations for the customary units.

3) Arranges quantities in order.

4) Calculates averages and errors of measurement.

b. Comments

Have students bring in as many of the containers as possible over a period of time. Some of the equipment needed could be borrowed from the Science department, if it is not available in the mathematics department. Have students leave the labels on all the containers.

The correct spelling and the correct abbreviations for the customary units should be stressed.

Review how to graph on the number line and the difference between measurement of weight and capacity.

c. Activities

1) Liquid Measure: Laboratory (pg. 5). Instead of using water to measure out the volume, use sand. Be careful of the packing element in selecting your measuring media.

2) Laboratory: Temperature (pg. 8). Stress the correct use of the equipment. Students should have the opportunity to actually measure the temperatures. Review how to find averages and how to find the error of measurement.

3) Temperature: Range and Oven (pg.9). This exercise should be done with the range at the home of each student. The student will relate the relationship of the calibration on a dial to a number line.

4) Laboratory: Canned Goods (pg.10). The difference of net weight and fluid ounces should be stressed. The students are to measure the capacity of a variety of cans. Discussions as to why certain foods are measured using weight and others using fluid ounces should be held. Each lab kit should have a wide variety of cans. There should be 2 or 3 students for each kit.

2. Converting

a. Objectives

1) Converts within customary units
2) Orders units
3) Adds, subtracts, multiplies and divides whole numbers, fractions and decimals

b. Comments

Cookbooks may be used as a reference for these activities. Students should also use the equivalences from the laboratory exercises.

Show two methods of converting, using a proportion and cancellation of units.

c. Activities

1) Liquid Measure and Converting (pg.12)
REFRESHER MATHEMATICS,
pp. 391-396, converting liquid measures.
2) REFRESHER MATHEMATICS,
pp. 396-399, converting dry measures.
3) REFRESHER MATHEMATICS,
pp. 400-404, converting weights.
4) ARITHMETIC SKILLS WORKBOOK,
pp. 217-219, converting liquid measures.
pp. 219-221, converting weights.
5) MATHIMAGINATION,
pp. E19-20, E41.
6) TROUBLE SHOOTING MATHEMATICS,
pp. 291-293, 303-307.

3. Miscellaneous

a. Objectives

1) Determines the factor of increase/decrease of a recipe
2) Uses the factor to find the proportions for the recipe
3) Rounds off to the appropriate unit
4) Uses ratios and proportions
5) Converts customary units when necessary

b. Comments

Review with students how to solve a proportion to convert to a smaller unit when decreasing a recipe. Recipes of foods that are popular with the students may be obtained from your cafeteria manager.

Have students keep the recipes for use in the Unit Project. (pg.45)

c. Activities

1) Increasing a Recipe (pg.14). Students will multiply by the factor; then they may have to convert to a larger unit if the larger unit is a more appropriate measure of the item.

2) Decreasing a Recipe (pg.17). Students may have to convert to a smaller unit before multiplying or dividing by the factor.

Applications B
Measurement in the Kitchen
Activity IA-1.c.1
Liquid Measure: Laboratory

Name_____

Date_____Pd._____

Score_____

Materials needed: Half gallon milk cartons, quart milk cartons, school milk cartons, gallon mayonnaise jars, quart mayonnaise jars, pint mayonnaise jars, plastic syrup gallons or bleach containers. (There should be enough for two students to work at each of the different types of containers: milk cartons, mayonnaise jars and syrup containers.) For each of the stations have a measuring cup, a teaspoon measure and a tablespoon measure. Use sand to fill the containers.

Use the appropriate measuring tools to find the following comparisons.

1. 1 cup = _____pint(s)
2. 1 pint = _____cup(s)
3. 1 quart = _____cup(s)
4. 1 quart = _____pint(s)
5. 1 gallon = _____quart(s)
6. 2 quarts = _____gallon(s)
7. 1 cup = _____ounce(s)
8. 8 ounces = _____cup(s)
9. $\frac{1}{2}$ cup = _____tablespoon(s)
10. 1 tablespoon = _____teaspoon(s)
11. $\frac{1}{4}$ cup = _____tablespoon(s)
12. 8 pints = _____quart(s)
13. a school milk carton = _____cup
    = _____pint(s)
    = _____ounce(s)
14. $\frac{1}{2}$ gallon = _____quarts

Write an appropriate abbreviation for each of the following.

15. teaspoon _____
16. tablespoon _____
17. cup _____
18. pint _____
19. quart _____
20. gallon _____
21. ounces _____

Arrange the above units in #15 - 21 from the largest to the smallest.

22. _____ _____ _____ _____ _____ _____ _____
largest smallest

Liquid Measure: Laboratory (cont.)

Complete the following using the measuring tools or by using the equivalent values you found in the previous exercise.

23. 3 gal. = _____qt.

24. 3 qt. = _____pt.

25. $\frac{1}{2}$ gal. = _____ qt.

26. $5\frac{1}{2}$ gal. = _____qt.

27. 10 qt. = _____ gal.

28. $1\frac{1}{2}$ pt. = _____c.

29. 12 oz. = _____c.

30. 9 c. = _____ pt.

State the equivalences for the following units.

1 gal. = _____qt.
= _____pt.
= _____c.
= _____oz.

1 qt. = _____gal.
= _____pt.
= _____c.
= _____oz.

1 pt. = _____gal.
= _____qt.
= _____c.
= _____oz.

1 c. = _____gal.
= _____qt.
= _____pt.
= _____oz.
= _____T.
= _____tsp.

1 oz. = _____T.
= _____tsp.

1 T. = _____tsp.

Liquid Measure: Laboratory (cont.)

Use the equivalences for the measures; then use the measuring tool to check your answers. Arrange the following in order from largest to smallest.

31. 3 c., 1 qt., $1\frac{1}{2}$ pt. _____

32. $\frac{1}{2}$ gal., 3 qt., 8 pt. _____

33. 32 oz., 1 c., 1 pt. _____

34. 8 tsp., 1 T., $\frac{1}{2}$ c. _____

35. 1 gal., 5 qt., 9 pt. _____

Applications B
Measurement in the Kitchen
Activity IA-1.c.2
Laboratory: Temperature

Name_____

Date_____Pd._____

Score_____

Materials needed: Fahrenheit thermometer
hot plate
pot for boiling water
ice
insulated cups

Instructions:

1. Fill the container for boiling water and place on the hot plate. Be sure the water has reached its boiling point. (Water should be bubbling.) DO NOT let bulb of the thermometer touch the bottom of the pot. Record the temperature on the chart.

2. Fill an insulated cup with ice. Pack the cup with as much crushed ice as possible. Fill the cup with water and let stand a few minutes. Record the temperature of the water on the chart.

3. Record the temperature of the room on your chart.

4. Record the temperature of your body on the chart.

What did I measure?	Recorded °F	Class Average	Error in Measurement
1.			
2.			
3.			
4.			

Applications B
Measurement in the Kitchen
Activity IA-1.c.3
Temperature: Range and Oven

Name_____

Date_____Pd._____

Score_____

Instructions: Use your range at home to answer the following questions.

Range: electric or gas? _____

self-cleaning? _____

make? _____

number of burners or coils? _____

Oven: Draw a picture of the oven dial.

1. What is the highest temperature that is calibrated on the oven dial? _____
2. What is the lowest temperature calibrated on the dial? _____
3. Is the lowest temperature higher or lower than the boiling point of water? _____
4. Graph the temperatures calibrated on the oven dial on the number line below.

_____

5. Mark the boiling point of water on the line. Label the point BP.
6. In baking terms slow, moderate and high oven temperatures are used. In your opinion what is the range of temperatures that fall into each category?

Slow _____

Moderate _____

High _____

Applications B
Measurement in the Kitchen
Activity IA-1.c.4
Laboratory: Canned Goods

Name _____

Date _____ Pd. _____

Score _____

Materials needed: Gallon cans, any other kinds of cans in a kitchen, measuring cups.

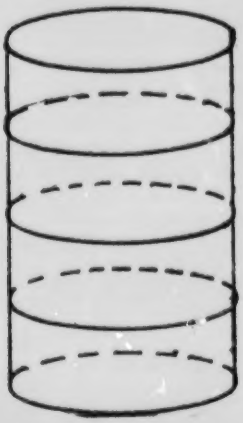
1. Read the label on the can and record the data on the chart. Record the units used to measure the contents of the can.

Contents of the can	Measure of contents	Weight/Capacity
a) tomato sauce	net wt. 8 oz	weight
b)		
c)		
d)		
e)		
f)		
g)		

2. Use a measuring cup and find the capacity of the cans in the kit.

Description of can	Measure of contents	Measure of capacity
a) Crushed pineapple	net wt. 15 $\frac{1}{4}$ oz.	2 cups
b)		
c)		
d)		
e)		
f)		
g)		

3. Get a measuring cup and a gallon can. Record the results.



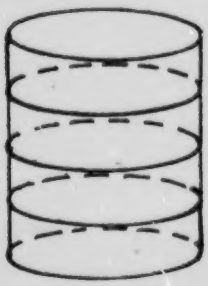
a) 4th or top ring = _____c.

b) 3rd ring = _____c.

c) 2nd ring = _____c.

d) 1st ring = _____c.

4. Get a measuring cup and a one pound coffee can. Record the results.



a) 4th or top ring = _____c.

b) 3rd ring = _____c.

c) 2nd ring = _____c.

d) 1st ring = _____c.

5. Find a can that has a capacity of:

a) 1 cup _____

b) 1 pint _____

c) 1 quart _____

6. Can you find a can that will weigh one pound no matter what you want to weigh? Explain your answer.

17

Applications B
Measurement in the Kitchen
Activity IA-2.c.1
Liquid Measure: Converting

Name_____

Date_____Pd._____

Score_____

Find the following equivalences:

a) 1 tsp. = 60 drops

b) 1 T. = 3 tsp.

c) 1 c. = 16 T.

d) 1 pt. = 2 c.

e) 1 qt. = 2 pt.

f) 1 gal. = 4 qt.

Fill in the equivalences and show all work.

1. $\frac{1}{2}$ tsp. = _____drops

2. 2 tsp. = _____T.

3. 6 tsp. = _____T.

4. 8 T. = _____c.

5. 32 T. = _____c.

6. 8 c. = _____pt.

7. 8 c. = _____qt.

8. 4 T. = _____c.

9. 1 c. = _____tsp.

10. 24 pt. = _____qt.

11. 40 qt. = _____gal.

12. 8.4 c. = _____pt.

13. 1600 T. = _____pt.

14. 1600 T. = _____c.

15. 1600 T. = _____qt.

16. $\frac{3}{4}$ c. = _____T.

17. 9 c. = _____pt.

18. 24 T. = _____c.

19. $5\frac{1}{2}$ pt. = _____c.

20. $3\frac{1}{4}$ qt. = _____pt.

19

Applications B
Measurement in the Kitchen
Activity IA-3.c.1
Increasing a Recipe

Name_____

Date_____ Pd._____

Score_____

The recipe for Aloha Ribs (pg.15) serves 8 people.

1. If you wanted to serve eighty people, by what factor would you multiply the recipe?
2. If you went to the supermarket, bought a bag of spareribs which weighed 9 pounds and wanted to use all of it for Aloha Ribs, by what factor would you multiply the recipe?
3. As you are clearing out your freezer, you find 2 pounds of spareribs; by what factor would you multiply the recipe, if you wanted to use the ribs for Aloha Ribs.
4. Fill in the chart, if you are to make Aloha Ribs for 100 people.

   The factor you would use to multiply by is _____.

Amount of Recipe	Amount Needed	Express Your Answer As°
4 lb. spareribs	a)	lb.
0.75 c. cornstarch	b)	lb.*
0.25 c. molasses	c)	c.
0.25 c. soy sauce	d)	qt.
0.5 c. sugar	e)	lb.*
0.75 c. vinegar	f)	qt.
0.75 c. pineapple juice	g)	qt.
1-10 oz. can pineapple chunks	h)	gal.
1 turnip, sliced	i)	

* Use a cookbook to find the equivalence for these quantities.

° Round to the nearest tenth.

ALOHA RIBS

Serves 8 people

Ingredients:

4 lb. spareribs
0.75 c. cornstarch
0.25 c. molasses
0.25 c. soy sauce
0.5 c. sugar
0.75 c. vinegar
0.75 c. pineapple juice
1-10 oz. can pineapple chucks
1 turnip, sliced

Mix above ingredients together. Bring to boil, simmer; stir occasionally. Cook 1 hour on medium heat. Add turnip, cornstarch and pineapple juice.

PUNCH

Ingredients:

2/3 c. Tang
1/2 c. sugar
4 1/2 c. water
1/4 tsp. almond extract
2 c. pineapple juice
1 qt. ginger ale

Mix above ingredients together. Chill before serving.

You want to serve punch with the Aloha Ribs. A recipe for easy punch is on pg.15 .

5. Add up the amount of liquids this recipe requires. Round off to the nearest half-cup. (Ingredients c, e and f.)

6. You are to make this punch and use 8 oz. cups to serve your punch in. The guests will drink approximately three cups of punch each. How many cups of punch would you need for your 100 guests?

   By what factor would you multiply the recipe? (Round off to the nearest tens.)

7. Fill in the chart. Show all work on a separate sheet of paper.

Amount of Recipe	Amount Needed	Express Your Answer As
$\frac{2}{3}$ c. Tang	a)	pt.
$\frac{1}{2}$ c. sugar	b)	c.
$4\frac{1}{2}$ c. water	c)	gal.
$\frac{1}{4}$ tsp. almond extract	d)	T.
2 c. pineapple juice	e)	qt.
1 qt. ginger ale	f)	gal.

8. Check to see that you have enough punch for all of your guests.

Applications B
Measurement in the Kitchen
Activity IA-3.c.2
Decreasing a Recipe

Name_____

Date_____Pd._____

Score_____

You may need to use a cookbook as a reference for this exercise for the equivalences.

1. Find the equivalence:

   1 lb. of butter = _____blocks

   1 5-lb. bag of granulated sugar = _____cups

2. If the recipe yields 300 cookies and you want to bake five dozen cookies, by what factor would you decrease the recipe?

3. Fill in the chart to find the proportions you would need for five dozen Grandma Cookies. (Miss Yoshioka, Waipahu High School)

Amount of Recipe	Amount Needed	Express Your Answer As
7 lb. butter	a)	blocks
10.5 c. sugar	b)	c.
7 qt. flour	c)	c.
4 T. + 2 tsp. baking soda	d)	tsp.
7 T. vanilla	e)	tsp.

Cream butter and sugar, add vanilla. Add dry ingredients. Bake on ungreased sheets at 350° F, until golden.

4. The recipe for Cascaron follows on the next page; fill in the chart.

   The recipe yields 30 dozens but you want to make 3 dozens; by what factor would you multiply the recipe?

Amount of Recipe	Amount Needed	Express Your Answer As
$6\frac{1}{4}$ lb. mochiko	a)	oz.
$7\frac{1}{2}$ c. raw sugar	b)	c.
5 qt. shredded fresh coconut	c)	c.
$2\frac{1}{2}$ qt. coconut milk	d)	c.
$2\frac{1}{2}$ gal. oil for frying	e)	qt.

Mix first three ingredients together thoroughly. Add coconut milk. Mix only enough to moisten dry ingredients. Form dough into 1" balls and flatten. Deep fry in 375°F for 3-4 min. until golden brown. Cool on cake rack or in colander.

I. Measurement in the Kitchen

B. Measuring With Metric Units

1. Measuring

a. Objectives

1) Measures with metric units of capacity and weight
2) Knows the metric symbols and prefixes

b. Comments

Students should find it much easier to learn the metric units by doing the measuring themselves. This is especially important because we are beginning to see more items labeled with the metric equivalents of the customary units. The measures for length will be covered in a later unit.

c. Activities

1) Have students look at labels which have the metric as well as customary units to make them aware of how often these are found on labels. Materials: Collection of labels from canned goods, boxed items, ads of camera equipment and other items which are in metric measure. Assign students to bring in other labels that they may find around their homes.

2) Introduce the metric units and their prefixes: Metric Units and Prefixes (pg. 22). Information and additional exercises can be found in the following sources.
LEARNING ABOUT THE METRIC SYSTEM IN THE HIGH SCHOOL, p. 3.
ON THE ROAD TO METRICATION, pp. 11-13, exercises on prefixes.

3) Laboratory Activity: Set up lab stations with enough equipment so that there are 2 or 3 students in a group. Lab worksheet items should be adapted to items available in each class. Materials: Liter and milliliter measures, balances or scales, sand or water to be measured, items on lab sheet.

4) REFRESHER MATHEMATICS, pp. 432-436, metric units and prefixes.

5) LEARNING ABOUT THE METRIC SYSTEM IN THE HIGH SCHOOL, pp. 36-45, exercises on capacity and weights.

2. Converting

a. Objectives

1) Multiplies and divides by powers of 10
2) Converts within the metric units
3) Adds, subtracts, multiplies and divides using metric units

b. Comments

Converting between metric units is a relatively easy process since the metric system is based on powers of 10. Shortcuts using the movement of the decimal point left or right can be used.

c. Activities

1) REFRESHER MATHEMATICS,
pp. 196-198, exercises in multiplying and dividing by powers of 10.

2) REFRESHER MATHEMATICS,
pp. 434-435, 439-440, exercises in converting within the metric measures.

3) CONSUMER MATHEMATICS,
pp. 459-460, computing and solving problems with metric measures.

4) REFRESHER MATHEMATICS,
pp. 209-211, shortcuts in multiplying and dividing.

5) ARITHMETICS SKILLS WORKBOOK,
pp. 149-150, multiplying by powers of 10.
pp. 155-156, dividing by powers of 10.
pp. 237-239, converting within metric units.

6) PRE-ALGEBRA WITH PIZZAZZ,
pp. CC-34.

3. Converting between customary and metric units

a. Objectives

1) Compares customary and metric units.

2) Uses tables to convert between metric units.

b. Comments

To make the transition from customary to metric units of measure we must be aware of the comparisons between some of the more common units. One example is how a gallon

of gasoline compares with a liter of gasoline since gasoline is being sold by the liter by some gasoline dealers.

The units for length will be covered in a later unit.

It should be made clear to the students that the conversion values are not exact values.

c. Activities

1) Comparison of metric and customary units (pg. 24). Have students compare the capacities between a liter and a quart and a gallon; between a pound and a kilogram, etc. Materials: measuring devices, items to be measured. Items on the list can be adapted to materials available.

2) Select appropriate exercises from the following:
REFRESHER MATHEMATICS,
pp. 444-448, 450, converting between customary and metric units.

3) Converting Recipes (pg. 25).

4) ARITHMETIC SKILLS WORKBOOK,
pp. 240-242, converting between customary and metric units.

5) Additional converting recipe exercises can be written by using the recent Gas Company's recipes which are written in both the metric and customary units.

Applications B
Measurement in the Kitchen
Activity IB-1.c.2
Metric Units and Prefixes

Name_____

Date_____Pd._____

Score_____

1. From the class discussion and the textbook write the correct prefix and abbreviation for the following.

		Prefix	Abbreviation
a)	1000 liters	_____liter	_____
b)	100 liters	_____liter	_____
c)	10 liters	_____liter	_____
d)	1 liter		_____
e)	$\frac{1}{10}$ liter	_____liter	_____
f)	$\frac{1}{100}$ liter	_____liter	_____
g)	$\frac{1}{1000}$ liter	_____liter	_____

2. The same prefixes are used on all metric units; therefore you should be able to complete the following by using the same pattern as the above exercises. Write the prefix on each blank.

a) 10 grams = _____gram

b) 100 grams = _____gram

c) $\frac{1}{10}$ gram = _____gram

d) $\frac{1}{100}$ gram = _____gram

3. Using the above information, answer the following questions.

a) How many centigrams is there in a gram? _____

b) If a pebble weighs 1 dekagram, how many are needed to weigh a total of one kilogram? _____

c) How many milliliters are needed to make a centiliter? _____

d) How many centigrams are there in a decigram?_____

e) How many milliliters are there in a deciliter? _____

Applications B
Measurement in the Kitchen
Activity IB-1.c.3
Lab Worksheet on Metric Units

Name_____

Date_____ Pd._____

Score_____

Complete the following table by making the appropriate measurements.

Item	Capacity	Weight
a) soda can	_____ml	_____g
b) ½ pint milk carton	_____ml	_____g
c) 1 qt. milk carton	_____ml	_____g
d) 1 poker chip		_____g
e) a penny		_____g
f) a quarter		_____g
g) a spoon	_____ml	_____g
h) 3 thumb tacks		_____g
i) 5 sheets folder paper		_____g
j) 1 large paper clip		_____g
k) 1 math textbook		_____kg
l) 1 qt. jar filled with sand	_____l	_____kg

Applications B
Measurement in the Kitchen
Activity IB-3.c.1
Comparison of metric and customary units

Name_____

Date_____Pd._____

Score_____

Use the appropriate measuring tools to answer the following.

1. Which is greater, a quart or a liter? _____

2. How does a liter compare with a gallon? _____

3. Which is a better buy, a gallon of gasoline for $1.00 or a liter of gasoline for $0.25? _____

4. Find the measure of the following items:

Item	Customary units	Metric units
a) 12 oz. can soda	_____cups	_____ml
b) ½ pint milk carton	_____cups	_____ml
c) ½ gal. carton	_____cups	_____ml
d) paper cup	_____cups	_____ml
e)		
f)		

5. Which is larger? If you are not sure of the answer, use a balance scale to measure items weighing the necessary weights. Circle the correct answer.

   a) pound or kilogram

   b) quart or liter

   c) 2 pounds or 1 kilogram

   d) 8 pounds or 1 kilogram

   e) 5 quarts or 2 liters

   f) 1 gallon or 4 liters

   g) 1 cup or 200 ml

   h) 1 pint or 650 ml

Applications B
Measurement in the Kitchen
Activity IB-3.c.3
Converting Recipes

Name_____

Date_____ Pd._____

Score_____

Use the following conversion values; fill in the blanks for those not given.

$\frac{1}{4}$ tsp. = 1.25 ml

$\frac{1}{2}$ tsp. = _____ml

$\frac{3}{4}$ tsp. = _____ml

1 tsp. = _____ml

1 Tbs. = _____ml

$\frac{1}{4}$ cup = 59 ml

$\frac{1}{3}$ cup = 79 ml

$\frac{1}{2}$ cup = _____ml

$\frac{2}{3}$ cup = 157 ml

$\frac{3}{4}$ cup = _____ml

1 cup = _____ml

Lani had a new set of metric measuring tools in her kitchen but the recipe she wanted to use was given in the customary units for 6 servings. Find the corresponding metric units for 6 servings; then find (in metric units) the ingredients required for 9 servings.

Recipe for Chicken Salad

Ingredients for 6 Servings		Metric for 6	Metric for 9
2 cups	cooked cold chicken	a)	
1 cup	chopped celery	b)	
4 tsp.	lemon juice	c)	
2	hard boiled eggs	d)	
1 Tbs.	chopped onions	e)	
$\frac{1}{4}$ cup	slivered almonds	f)	
$\frac{1}{2}$ cup	mayonnaise	g)	

salt and pepper to taste

Find the metric equivalent for the following.

h) $2\frac{1}{2}$ cups = _____ml

i) 5 tsp. = _____ml

j) $2\frac{3}{4}$ tsp. = _____ml

k) 5 cups = _____ml

I. Measurement in the Kitchen

C. Making a Wise Purchase

1. Finding fractional or multiple prices

a. Objectives

1) Determines the cost of an item on a grocery list when it is a fractional part or a multiple of the stated price.

2) Rounds off numbers.

3) Reads and understands the cost label on packaged goods.

b. Comments

Students as consumers should be made aware that although the price of an item is given as x cents per pound, it is often packaged in smaller or larger amounts. It is also important that they be able to read the label on meats and other produce and be able to calculate the cost of items when they are not labeled or not bought in the exact amounts as stated in the price per unit.

c. Activities

1) Rounding Off (pg.30).

2) Rounding Off on Purchases (pg. 31).

3) Finding the cost of items on a grocery list (pg.32).

4) Reading the label (pg. 33). Have student read the label on packaged meats and produce. Materials: collect cost labels from various packages of meat and produce; paste the label on numbered cards and as the cards are passed around the class, students are to read the information and complete the worksheet.

5) REFRESHER MATHEMATICS,
pp. 177-178, multiplying decimals
pp. 182-192, dividing decimals
pp. 155-157, rounding off

6) CONSUMER MATHEMATICS,
pp. 64-71, cost of items on grocery list

2. Finding total cost

a. Objectives

1) Finds the total cost of a purchase, including the sales tax.

2) Finds the percent of a number.

3) Uses equations to solve problems.

b. Comments

Before working on this unit the students must know how to find the cost of an item given the quantity and unit price. They must also be familiar with simple percents, be able to convert it to a decimal and be able to find the percent of a number. Skills involving fractions and decimals will be reinforced. The calculator may be used in many of the worksheets and activities. Rounding off amounts to the nearest cent will also be involved.

c. Activities

1) Make a 4% tax table by using the calculator

a) Find 4% of all amounts from 1¢ to $1.00.
b) Use the table to generalize and make a tax table as found at the checkout counter of stores.
c) Use the tax tables to find the tax on a purchase.

2) Finding the Sales Tax on a Purchase (pg. 34).

3) Finding the Total Cost of a Purchase (pg. 35).

4) Shopping at Mahalo Supermarket (pg. 36). The student will calculate the cost of items, compute the sub total, compute the tax, then find the total cost.

5) REFRESHER MATHEMATICS,
pp. 498-503, solving simple equations.

6) Using Equations to Find an Unknown Number (pg. 37).

7) ARITHMETIC SKILLS WORKBOOK,
pp. 181-183, finding the percent of a number.

8) MATHIMAGINATION,
pp. 44, 46, percents.

9) MATHEMATICS FOR DAILY USE,
pp. 179-181, finding the percent of a number.

pp. 183-185, finding the percent of a number
pp. 371-372, taxes

10) REFRESHER MATHEMATICS,
pp. 232-235, finding the percent of a number
pp. 562-563, sales tax

3. Finding unit cost

a. Objectives

1) Calculates the unit price.

2) Rounds off fractional parts of a cent.

3) Solves proportions.

b. Comments

Unit pricing can be approached in two different ways. One way is by dividing the cost of an item by its weight or quantity. This method will reinforce skills in dividing whole numbers, fractions and decimals. A second approach is to use the proportion method. This will reinforce skills in multiplication and division and can also be used to introduce solving of simple equations. The calculator can also be used to calculate or to check computation. Both methods will involve rounding.

c. Activities

1) Finding the Unit Price by Dividing (pg. 39).

2) Finding the Unit Price by Proportions (pg. 40).

3) Unit Pricing at the Supermarket (pg. 41). This is a field activity. Papers can be checked by having each student check someone else's assignment using the calculator.

4) ARITHMETIC SKILLS WORKBOOK,
pp. 159-161, dividing and rounding.
pp. 297-299, unit pricing.

5) MATHEMATICS FOR DAILY USE,
pp. 151-157, solving proportions.

6) MATHIMAGINATION,
pp. E 22-27, multiplication of decimals.
pp. E 30-34, 37, division of decimals.
pp. E 26, 41, rounding and solving proportions.

7) REFRESHER MATHEMATICS,
pp. 519-521, unit pricing.
pp. 550-551, unit pricing.

4. Deciding which is a better buy

a. Objectives

1) Decides which item is the better buy.

2) Rounds off fractional parts of a cent.

3) Calculates the amount of savings when getting the better buy.

b. Comments

Before doing this unit the student must be able to calculate the unit price of any given item. The skills needed to calculate the unit price will be reinforced further as students realize how this can be used to help them save money. When working on the better buy, it should be pointed out to students that a lower unit price is not the only factor to consider when making a purchase. The quality of an item is also important. Moreover, the size and the quantity of an item purchased must be decided upon to insure the least amount of waste.

c. Activities

1) Finding the Better Buy (pg.42).

2) Comparison Shopping (pg. 43). Newspaper activity on finding the better buy. The Wednesday newspaper will be needed.

3) How Much Money Can You Save? (pg.44)

4) REFRESHER MATHEMATICS,
pp. 552-553, finding the better buy.

Applications B
Measurement in the Kitchen
Activity IC-1.c.2
Rounding Off

Name_____

Date_____ Pd._____

Score_____

Examples:	Answer
Round off 0.2645 to the nearest tenth	0.3
Round off 0.2645 to the nearest hundredths	0.26
Round off 0.2645 to the nearest thousandths	0.265

Set A

1. Round off to the nearest tenth.

   a) 0.37 _____ b) 0.168 _____ c) 0.429 _____ d) 0.076 _____

2. Round off to the nearest hundredths.

   a) 0.344 _____ b) 0.125 _____ c) 0.248 _____ d) 0.998 _____

3. Round off to the nearest thousandths.

   a) 0.2452 _____ b) 0.0348 _____ c) 0.23965 _____ d) 0.0008 _____

4. Round off to the nearest cent.

   a) $0.594 _____ b) $3.486 _____ c) $9.895 _____ d) $9.9970_____

Check your answers on Set A, then do Set B.

Set B

1. Round off to the nearest whole number.

   a) 35.8 _____ b) 8.2 _____ c) 10.25 _____ d) $47\frac{1}{3}$ _____

   e) $227\frac{3}{4}$ _____ f) $4\ \frac{7}{100}$ _____

2. Round off to the nearest tenth.

   a) 42.34 _____ b) 56.82 _____ c) 57.06 _____ d) 46.49 _____

   e) 23.97 _____ f) 934.83 _____

3. Round off to the next (higher) cent.

   Example: $\frac{\$0.99}{4} = \$0.24\frac{3}{4} = \$0.25$

   a) 43.9¢_____ b) $0.377 _____ c) $7.02\frac{2}{3}$ _____

   d) $87\frac{2}{3}$¢_____ e) $\frac{\$1.25}{2}$ _____ f) $0.99 \times \frac{1}{2}$ _____

Applications B
Measurement in the Kitchen
Activity IC-1.c.3
Rounding Off on Purchases

Name_____

Date_____Pd._____

Score_____

When purchasing a single unit, if there is a fraction of a cent it is rounded off to the next higher cent.

1. Find the cost of one unit of each of the following.

   a) 4 cans of tomato sauce, 79¢; 1 can, _____

   b) 3 lb. of oranges $1.09; 1 lb., _____

   c) 3 cans of soup, 88¢; 1 can, _____

   d) 2 lb. of grapes, $1.43; 1 lb., _____

   e) 2 cans of juice, 99¢; 1 can, _____

   f) 2 packages of seasoning mix, 65¢; 1 pkg., _____

   g) 3 cans of beans, 85¢; 1 can, _____

   h) 3 cartons of yogurt $1.00; 1 carton, _____

2. The following is part of a grocery price list.

Soda, 2 bottles, 65¢	Corn, 5 cans, $1.25
Peaches, 2 cans, $1.08	Pears, 6 cans, $1.50
Soup, 3 cans, 89¢	Tuna, 2 cans, $1.29

   Use the above list to find the cost of the following.

   a) 1 can of corn, _____

   b) 1 can of peaches, _____

   c) 1 can of soup, _____

   d) 3 cans of pears, _____

   e) 1 bottle of soda, _____

   f) 1 can of tuna, _____

   g) 4 cans of corn, _____

   h) 12 cans of soup, _____

Applications B
Measurement in the Kitchen
Activity IC-1.c.4
Finding the Cost of Items
on a Grocery List

Name_____

Date_____ Pd._____

Score_____

1. Review: Compute the following to the nearest cent.

a) $4 \times \$0.39 =$ _____

b) $\frac{1}{2} \times \$3.56 =$ _____

c) $\frac{3}{4} \times \$4.25 =$ _____

d) $1\frac{1}{2} \times \$0.99 =$ _____

e) $0.9 \times \$2.25 =$ _____

f) $\frac{3}{32} \times \$4.80 =$ _____

2. Find the cost of each item. Round off answers to the next whole cent.

	Item	Price per Unit	Fractional part	Cost
a)	steak	\$2.26 per pound	3 pounds	
b)	grapes	\$0.89 per pound	5 pounds	
c)	papayas	\$0.32 per pound	$2\frac{1}{2}$ pounds	
d)	eggs	\$0.95 per pound	$1\frac{1}{2}$ dozen	
e)	butter	\$1.89 per pound	$\frac{1}{4}$ pound	
f)	ham	\$2.28 per pound	0.7 pound	
g)	gasoline	\$1.00 per gallon	5.7 gallons	
h)	coffee	\$3.15 per pound	3 pounds	
i)	pineapple	\$0.47 per pound	$5\frac{1}{2}$ pounds	
j)	hamburger	\$1.09 per pound	0.98 pound	
k)	apples	\$0.33 per pound	$4\frac{2}{3}$ pounds	
l)	grapefruit	\$0.69 for 2 pounds	5 pounds	
m)	onions	\$0.69 for 3	5 onions	
n)	string beans	\$0.49 per pound	2 pounds	
o)	tomatoes	\$0.49 per pound	$3\frac{3}{4}$ pounds	
p)	turnips	\$0.23 per pound	3.22 pounds	
q)	watermelon	\$0.19 per pound	12.5 pounds	

Applications B
Measurement in the Kitchen
Activity IC-1.c.5
Reading Labels

Name_____

Date_____ Pd._____

Score_____

Read the labels found on the cards. Write the name of the item and answer the following questions for each item.

(a) What is the unit price?
(b) How much does it weigh?
(c) What is the cost of the package?

Item	(a) unit price	(b) weight	(c) cost
1. hamburger	$1.79/lb.	$1.05/lb.	$1.88
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Collect 3 cost labels from packages in your home, paste them to this sheet and answer the same questions as given above. Label them 11, 12 and 13.

11._____ (a) (b) (c)

12._____ (a) (b) (c)

13._____ (a) (b) (c)

Applications B
Measurement in the Kitchen
Activity IC-2.c.2
Finding the Sales Tax on a Purchase

Name_____

Date_____ Pd._____

Score_____

Instructions: Find the 4% tax on the following amounts. Round your answer off to the nearest cent. Show all computations and rounding.

1. $.33 ; _____

2. $ .53 ; _____

3. 39¢ ; _____

4. $1.12 ; _____

5. $2.75 ; _____

6. $5.79 ; _____

7. $40.02 ; _____

8. $37.30 ; _____

9 $525.00 ; _____

10. $143.65 ; _____

Applications B
Measurement in the Kitchen
Activity IC-2.c.3
Finding the Total Cost of a Purchase

Name_____

Date_____Pd._____

Score_____

Instructions: Find the amount of a 4% sales tax and the total cost for the following purchases. Show all work in the space provided.

	Sales Tax	Total Cost		Sales Tax	Total Cost
1. $.89 +	_____	= _____	7. $32.09 +	_____	= _____
2. $16.05 +	_____	= _____	8. $17.15 +	_____	= _____
3. $24.92 +	_____	= _____	9. $563.18 +	_____	= _____
4. $3.75 +	_____	= _____	10. $1000.00 +	_____	= _____
5. $9.71 +	_____	= _____	11. $2009.00 +	_____	= _____
6. $1.49 +	_____	= _____	12. $9760.87 +	_____	= _____

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Applications B
Measurement in the Kitchen
Activity IC-2.c.4
Shopping at Mahalo Supermarket

Name_____

Date_____ Pd._____

Score_____

Directions: The following is a list of items bought at Mahalo Supermarket. The quantity and unit price of each item are provided. Calculate the cost of each item and the total cost of the purchases. Show all computation on a separate sheet and attach to this sheet.

Item	Quantity	Unit Price	Cost
1. Cantaloupes	4 lbs.	33¢ a lb.	
2. Fresh Tomatoes	$1\frac{1}{2}$ lbs.	59¢ a lb.	
3. Chicken Noodle Soup	6 cans	3 cans for $.89	
4. Sardines	1 can	2 cans for 79¢	
5. Vienna Sausage	6 cans	2 cans for 89¢	
6. Bread	2 lbs.	1 lb. loaf for 67¢	
7. Stewing Chicken	$2\frac{1}{2}$ lbs.	49¢ a pound	
8. Pork Butt	6.4 lbs.	89¢ a pound	
9. Root Beer	2 dozen	6 cans for $1.39	
10. Watermelon	$7\frac{1}{4}$ lbs.	35¢ a pound	
		Sub Total	
		Tax	
		Total Cost	

Applications B
Measurement in the Kitchen
Activity IC-2.c.6
Using Equations to Find an Unknown Number

Name_____

Date_____ Pd._____

Score_____

Write an equation which can be used to solve for x. Solve the equation for the unknown number in the space provided.

A.	Original Price	Discount	Sale Price	Equation and Solution
1.	x	15¢	80¢	x - 15 = 80 x = 95
2.	$35	x	$27	
3.	x	$10	$56	
4.	$19	x	$16.50	
5.	x	$3.75	$11.25	

B.	Cost of Item	Tax	Total Cost	Equation and Solution
1.	x	5¢	$1.04	x + 5 = 104 x = 99¢
2.	98¢	x	$1.15	
3.	x	12¢	$3.20	
4.	$5.25	x	$5.46	
5.	x	19¢	$4.88	

C.	Quantity	Unit Price	Tax	Total Amount	Equation and Solution
1.	2	x	2¢	52¢	$2x + 2 = 52$ $2x = 50$ $x = 25$
2.	3	x	4¢	$1.12	
3.	2	x	15¢	$3.45	
4.	5	29¢	x	$1.61	
5.	.5	x	6¢	$1.46	
6.	x	49¢	12¢	$3.06	

Applications B
Measurement in the Kitchen
Activity IC-3.c.1
Finding Unit Price by Dividing

Name_____

Date_____Pd.___

Score_____

Find the price of one unit of each item. Round off to the nearest cent.

1. 8 ounces of mushrooms, $1.47; 1 oz., _____
2. 5 lb. of chicken $3.09; 1 lb., _____
3. 17 oz. can of fruit, 59¢; 1 oz., _____
4. 16 oz. box of crackers $1.05;, 1 oz., _____
5. 9 oz. box of crackers $.55; 1 oz., _____
6. 12 oz. Salami $1.39; 1 oz., _____
7. 12 oz., Portuguese sausage $1.95; 1 oz., _____
8. 16 oz. Portuguese sausage $2.25; 1 oz., _____
9. 4 bars of soap 65¢; 1 bar, _____
10. 2 boxes of tissue 99¢; 1 box, _____

Find the unit price to the nearest tenth of a cent.

11. 5 lb. bag of oranges $1.19; 1 lb., _____
12. 6 pack of soda $1.29; 1 can, _____
13. 1 case(24 cans) of soda $4.09; 1 can, _____
14. 2 oz. dried shrimp, $1.25; 1 oz., _____
15. 5 oz. dried shrimp, $2.69; 1 oz., _____
16. 3 cans of 16 oz. Pork and Beans $.99; 1 oz., _____
17. 1 lb. of bacon, $1.89; 1 oz., _____
18. 12 oz. of bacon, $1.49; 1 oz., _____
19. 3 lb.of coffee $7.99; 1 lb. _____
20. 5 lb. sugar, $1.19; 1 lb., _____

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Applications B
Measurement in the Kitchen
Activity IC-3.c.2
Finding the Unit Price by Proportions

Name_____

Date_____ Pd._____

Score_____

Example: Find the item with the lowest cost per ounce.

a) 8 oz. for 48¢

$\frac{8}{48} = \frac{1}{c}$

$8c = 48$

$c = 6$

1 oz. for 6¢

b) 16 oz. for 88¢

$\frac{16}{88} = \frac{1}{c}$

$16c = 88$

$c = 5.5$

1 oz. for 5.5¢

c) 30 oz. for $1.63

$\frac{30}{163} = \frac{1}{c}$

$30c = 163$

$c = 5.43$

1 oz. for 5.4¢

Answer: 30 oz. for $1.63 will have the lowest cost per ounce.

1. Solve each proportion. If necessary, round to the nearest tenth.

a) $\frac{4}{5} = \frac{a}{100}$

b) $\frac{16}{24} = \frac{1}{w}$

c) $\frac{3}{8} = \frac{n}{100}$

d) $\frac{3}{18} = \frac{1}{x}$

2. Find the item with the lowest cost per ounce. Write the unit price of each item on the side and circle your answer.

a) 2 oz. for 25¢
3 oz. for 30¢
6 oz. for 50¢

b) 16 oz. for 60¢
12 oz. for 48¢
7 oz. for 35¢

c) 4 oz. for 24¢
10 oz. for 58¢
18 oz. for 99¢

d) 3 oz. for 36¢
7 oz. for 77¢
8 oz. for 97¢

e) 6 oz. for 20¢
15 oz. for 45¢
27 oz. for 79¢
45 oz. for $1.25

f) 7 oz. for 91¢
15 oz. for $1.80
22 oz. for $2.75
35 oz. for $4.48

Applications B
Measurement in the Kitchen
Activity IC-3.c.3
Unit Pricing at the Supermarket

Name_____

Date_____Pd._____

Score_____

Instructions: Go to any supermarket of your choice and find the items listed below. The net weights of the items do not have to be the same. Record the price and weight in the appropriate block. After the price and weight columns have been filled in completely, take the sheet home and calculate the unit price of each item.

Name of supermarket_____ Date_____

Item/Brand		Price	Weight	Unit Price
Catsup	Delmonte			
	Heinz			
	Hunt's			
Peanut Butter	Jif			
	Peter Pan			
	Skippy's			
Frozen Orange Juice	Birdseye			
	Minute Maid			
	Orange Plus			
Bread White Regular	Holsum			
	Loves			
	Econo			
Potato Chips (Dip)	Frito-Lay			
	Granny Goose			
	Bell			
Bacon	Swift Premium			
	Uncle John's			
	Oscar Mayer			

Applications B
Measurement in the Kitchen
Activity IC-4.c.1
Finding the Better Buy

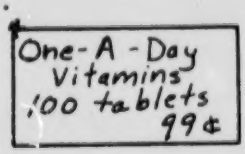
Name_____

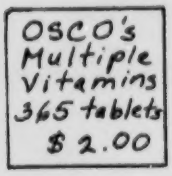
Date_____ Pd._____

Score_____

Shown are newspaper ads. Find out which of the two similar products is the better buy. Ignore your own preferences. Circle the item which is the better buy.

1.





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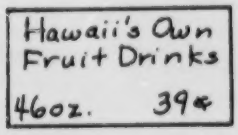
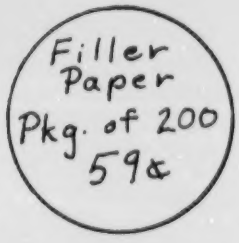


3.

4.



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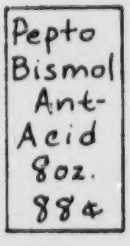

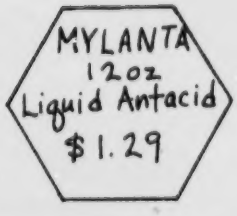

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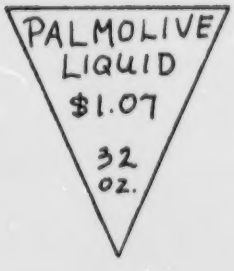

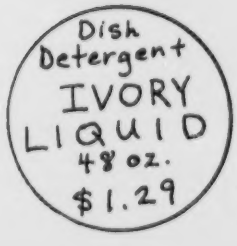

Applications B
Measurement in the Kitchen
Activity IC-4.c.2
Comparison Shopping

Name_____

Date_____Pd._____

Score_____

Instructions: Find pairs of similar items from the newspaper and record the indicated information in the chart. Calculate the unit price of each item and indicate the better buy. The first two have been done for you as examples. Round off each unit price to the nearest tenth of a cent.

Date of Wednesday newspaper_____

	Description of Item	New Weight	Cost	Unit Price	Better Buy?
1.	a) Wholesun Orange Juice	16 oz.	$1.29	8¢	
	b) Wholesun Orange Juice	12 oz.	$ .89	7.4¢	Better Buy
2.	a) DelMonte Pear Halves	16 oz.	$ .63	3.9¢	
	b) Hunt's Pear Halves	29 oz.	$ .79	2.7¢	Better Buy
3.	a)				
	b)				
4.	a)				
	b)				
5.	a)				
	b)				
6.	a)				
	b)				

Applications B
Measurement in the Kitchen
Activity IC-4.c.3
How Much Money Can You Save?

Name_____

Date_____ Pd._____

Score_____

Instructions: Given the items listed, along with the cost, weight and average weekly supply, calculate the unit price of each item. Then compute the average week's supply, weekly savings and yearly savings.

Choices	Unit Cost of a	Unit Cost of b	Average Weekly Supply	Cost of Average Week's Supply a	Cost of Average Week's Supply b	Amount Saved in week	Amount Saved in year
Cereal a) 8 oz. for 48¢ b) 12 oz. for 66¢	6¢	5.5¢	36 oz.	36 x6 216 or $2.16	36 x6.5 180 180 198.0 or $1.98	$2.16 -1.98 $.18	$.18 x52 36 90 $936
Peanut Butter a) 12 oz. for 99¢ b) 18 oz. for $1.18			10 oz.				
Guava Jelly a) 8 oz. for 76¢ b) 10 oz. for 85¢			6 oz.				
Bread a) 16 oz. for 64¢ b) 20 oz. for 95¢			12 oz.				
Soda a) 12 oz. can for 30¢ b) 30 oz. bottle for 57¢			40 oz.				

50

Measurement in the Kitchen

Unit Project:
Planning a Dinner for 10 People

Name_____

Date_____ Pd._____

Score_____

Instructions:

1. You are to plan a dinner for 10 people
2. You have $25.00 to spend on the entire dinner. Assume that the staples like rice, salt, pepper, and spices are available so you do not have to purchase these items.
3. The meal should include vegetables, meats, starches and a beverage at least. If you want to serve anything like pupus or dessert, that's okay but you have to stay within the $25.00 limit.
4. Your main dish recipe has to have at least seven ingredients.

RECORD:

I. Menu for the Dinner: (You do not have to fill in all of the blanks.)

Salad:_____

Main Dish:_____

Vegetables:_____

Beverage:_____

Dessert:_____

II. Recipe for the Main Dish:

_____

Serves _____People

Amount of Recipe	Amount Needed for 10 People

III. When you are making your shopping list, list all the items you need for your dinner. Include the weight of the item, cost of the item, and total cost of the item.

Store where I bought these items: _____

Item	Cost per Unit	Amount/Weight for 10 People	Total Cost
		Sub Total	
		Tax	
		TOTAL	

IV. Choose five items from your shopping list and compare unit prices to choose the better buy. Compare prices at two different stores.

Item	Store	Amount/Weight	Unit Price	Better Buy?
1.	a.			
	b.			
2.	a.			
	b.			
3.	a.			
	b.			
4.	a.			
	b.			
5.	a.			
	b.			

V. Money alloted for the dinner: $25.00

Money spent for the dinner: -_____

Balance: _____

VI. Calculate the cost per person of the meal:

$$\frac{\text{Cost of the total meal}}{\text{Number of people served}} = \text{Cost per person}$$

Calculations:

Cost per person for the meal:_____

II. Measurement in Home Furnishings

A. Measuring with Linear Units

1. Customary Units

a. Objectives

1) Reviews the customary linear units of measure.

2) Measures using customary units.

3) Converts within customary units.

4) Adds, subtracts, multiplies, and divides with customary units.

b. Comments

The customary units are still widely used in the measuring that is done around the home, in floor plans, appliances, carpeting, etc.

c. Activities

1) REFRESHER MATHEMATICS,
pp. 309-310, use of the ruler.

2) REFRESHER MATHEMATICS,
pp. 296-304, converting within customary units.

3) ARITHMETIC SKILLS WORKBOOK,
pp. 226-230, adding, subtracting, multiplying, dividing with customary units.

4) ARITHMETIC SKILLS WORKBOOK,
pp. 193-196, exercises in adding, subtracting, multiplying, dividing with customary units.

5) Additional measurement activities may be done by students going out on the campus and measuring various buildings or parts of the campus using a 100 ft. tape. The information could be used in the section on scaled drawings.

2. Metric Units

a. Objectives

1) Measures using metric units.

2) Converts within the metric units.

3) Compares common units of measure such as yards and meters, centimeters and inches.

b. Comments

The metric units of measure are in common use in some areas such as in automobiles and highway signs. The signs display both the metric and customary units for distance. The prefixes were covered in the unit on the kitchen so this would be reinforced in this section.

c. Activities

1) LEARNING ABOUT THE METRIC SYSTEM IN HIGH SCHOOL, pp. 5-7, study a metric tape to become familiar with the metric units of length.

2) Measuring Lengths in Metric Units (pg.52). Part of the worksheet is done by taking the actual measurement and part is done by making estimates after becoming familiar with some of the metric units.

3) REFRESHER MATHEMATICS, pp. 437-439, converting within the metric units.

4) PRE-ALGEBRA WITH PIZZAZZ. pp. CC 23-26, converting.

5) LEARNING ABOUT THE METRIC SYSTEM IN HIGH SCHOOL pp. 8-12, length.

6) MATHIMAGINATION, p. F22, measuring in millimeters. p. F23, converting.

3. Application Using Linear Units

a. Objectives

1) Knows the names of polygons.

2) Computes perimeter.

3) Applies the Pythagorean rule.

4) Estimates square roots.

5) Computes the circumference of a circle.

6) Uses trigonometric ratios in problem solving.

b. Comments

Students should become familiar with the most commonly used polygons such as squares, rectangles and triangles. They should also be able to divide an odd shaped polygon into regions having the shape of common polygons. The Pythagorean Rule can be applied to find unknown length of a right triangle. A square root table can be used to estimate square roots rather than teach the student the algorithm for finding square roots.

c. Activities

1) Discuss names of polygons such as triangles, quadrilaterals, pentagons, hexagons, octagons. Use pictures of various traffic signs as examples of the shapes in the world around us. You may also want to discuss special polygons such as squares, rectangles, and right triangles.

2) Recognizing Different Shapes (pg. 53)

3) Discuss square roots and the Pythagorean Rule.
REFRESHER MATHEMATICS,
pp. 258-263, square roots.
pp. 321-323, Pythagorean Theorem.

4) Estimating Square Roots (pg. 54).

5) Television Screen (pg. 55). Students can estimate square roots by using a table.

6) Using Trigonometric Ratios (pg. 56)

7) Perimeter (pg. 58). Students should be made aware that only like units of measure can be added.

8) Circles and Circumferences (pg. 61)

9) ARITHMETIC SKILLS WORKBOOK,
pp. 197-200, perimeter.

10) MATHEMATICS FOR DAILY USE,
pp. 240-246, polygons and perimeter.
pp. 269-272, square roots.
pp. 275-277, circumference.

11) PRE-ALGEBRA WITH PIZZAZZ,
pp. CC 28-31, perimeter and circumference.
pp. CC 49, 51-55, square roots and Pythagorean Rule.

12) REFRESHER MATHEMATICS,
pp. 317-321, perimeter and circumference.
pp. 326-329, trigonometric ratios.

4. Linear Units Used in Scale Drawings

a. Objectives

1) Uses properties of similarity in scale drawings.

2) Does scale drawings of the home.

b. Comments

One of the considerations in buying furniture and appliances for the home is: Will these items fit in the space available? One method to determine this is by using a scale drawing. Students should be able to pick the appropriate unit of measure in each situation. A review of solving proportions which was covered in the kitchen unit is given.

c. Activities

1) Similar Polygons (pg.63). The relationship between similar polygons is studied.

2) MATHEMATICS FOR DAILY USE,
pp. 158-161, exercises on similar polygons.

3) ARITHMETIC SKILLS WORKBOOK,
pp. 323-324, examples and exercises on scale drawings.

4) The Classroom (pg.66). Have students make a scale drawing of the classroom, include the furniture. Use a scale of one-fourth inch to one foot.

5) Home assignment: Have students make a scale drawing of their living room and a bedroom. Use graph paper and a scale of one-fourth inch to one foot.

6) REFRESHER MATHEMATICS,
pp. 310-311, scale drawings.

7) Additional scale drawings can be done using metric measures.

8) PRE-ALGEBRA WITH PIZZAZZ,
p. BB 31, proportions.

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Applications B
Measurement in Home Furnishings
Activity IIA-2.c.2
Measuring Lengths in
Metric Units

Name _____

Date _____ Pd. _____

Score _____

Find a reference for these lengths; use parts of your hand for smaller units. Each person may have his or her own references to help in learning what the units are. The first few units are customary units.

Measure	Reference
1. 1 inch	length of 2nd joint of index finger
2. $\frac{1}{2}$ inch	
3. 6 inches	
4. 12 inches = _____ foot	
5. 36 inches = _____ feet	
6. 10 mm = 1 cm	
7. 25 mm = _____cm	
8. 50 mm = _____cm	
9. 100 mm = _____cm	
10. 200 mm = _____cm	
11. 1000 mm = _____cm = _____m	
12. 2000 mm = _____cm = _____m	

Give an estimate of the length of the following. Use the references in the previous exercise to help you in making your estimates, then check your estimates by taking the actual measurement.

	Estimate	Actual
13. length of you index finger		
14. length of your hand span		
15. width of your ring finger		
16. length of your thumb		
17. width of your desk		
18. length of your foot		
19. length of your arm		
20. length of your pencil		

Applications B
Measurement in Home Furnishings
Activity IIA-3.c.2
Recognizing Different Shapes

Name_____

Date_____ Pd._____

Score_____

1. Give the name of each polygon shown and tell the number of sides.

a) b) c) d)

2. Name three objects or things that have the following shapes.

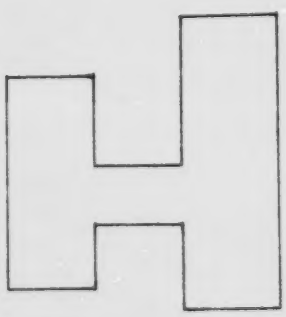
Square	Rectangle	Triangle
a)_____	_____	_____
b)_____	_____	_____
c)_____	_____	_____

3. Draw one or more segments to divide the odd shaped figures into two or more figures which are either squares, rectangles or triangles.

a) b) c)

d) e)

f)



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Applications B
Measurement in Home Furnishings
Activity IIA-3.c.4
Estimating Square Roots

Name_____

Date_____ Pd._____

Score_____

1. Tell between what two whole numbers the following numbers lie.

a) $\sqrt{15}$ ____and____

b) $\sqrt{30}$ ____and____

c) $\sqrt{58}$ ____and____

d) $\sqrt{75}$ ____and____

e) $\sqrt{260}$ _____and_____

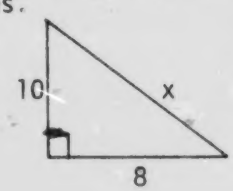
f) $\sqrt{500}$ _____and_____

g) $\sqrt{830}$ _____and_____

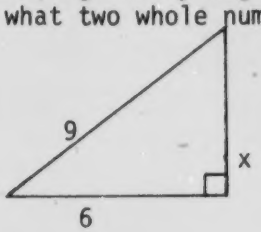
i) $\sqrt{1000}$ _____and_____

2. Set up an equation for each right triangle using the Pythagorean Rule and solve for the unknown. Then tell between what two whole numbers each answer lies.

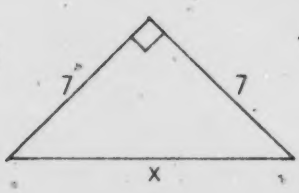
a)



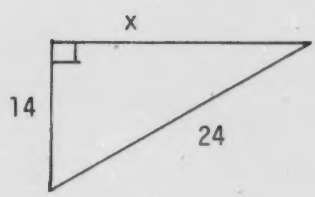
b)



c)



d)



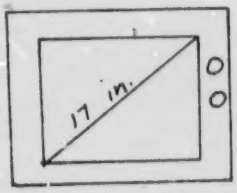
Applications B
Measurement in Home Furnishings
Activity IIA-3.c.5
Television Screen

Name_____

Date_____Pd._____

Score_____

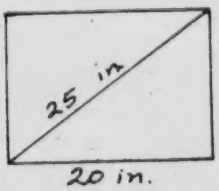
A television set described as having a "17 inch screen" is a set whose screen has a diagonal measure of 17 inches.



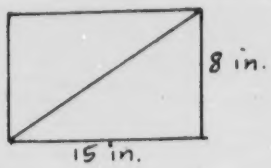
The Pythagorean Rule can be used to find the length of the diagonal of any square or rectangle. This rule can, therefore, be used to find the length of the diagonal or dimensions of any television screen.

In each of the following television sets, the measure of the length, width or diagonal is missing. Find the missing dimension. Use a square root table or a calculator and round your answers to the nearest whole inch.

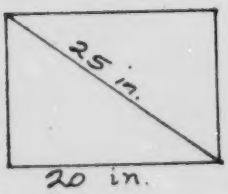
a)



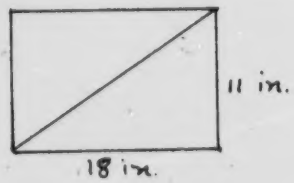
b)



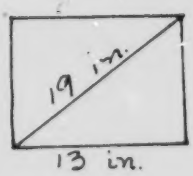
c)



d)



e)



C1

Applications B
Measurement in Home Furnishings
Activity IIA-3.c.6
Using Trigonometric Ratios

Name_____

Date_____ Pd._____

Score_____

The following are definitions of the sine, cosine and tangent of an acute angle A.

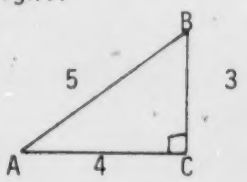
$\sin \angle A = \frac{opp}{hyp}$ $\cos \angle A = \frac{adj}{hyp}$ $\tan \angle A = \frac{opp}{adj}$

1. Name the following. Refer to the diagram to the right.

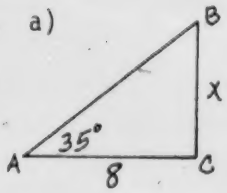
$\sin \angle A =$ _____ $\sin \angle B =$ _____

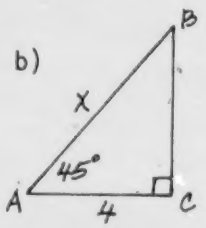
$\cos \angle A =$ _____ $\cos \angle B =$ _____

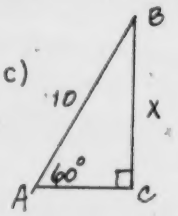
$\tan \angle A =$ _____ $\tan \angle B =$ _____

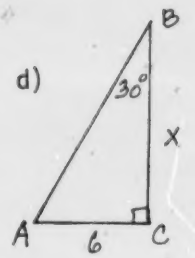


2. Set up an equation using either the sine, cosine, or tangent ratio to solve for x. Do not solve the equation.

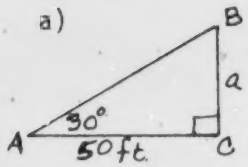


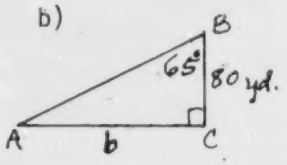


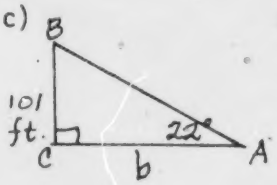


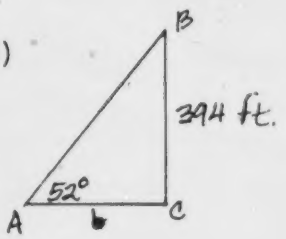


3. Set up an equation using one of the trigonometric ratios. Then use a table to find the appropriate approximate value and give an estimate answer. Then use a calculator to solve the equation and check your estimate. Round to the nearest whole number.









4. Solve each word problem using one of the trigonometric ratios. Draw a diagram. Round to the nearest whole number.

a) Find the angle of elevation of the sun if a vertical 10 foot pole casts a 6-foot shadow.

b) Who gains altitude more quickly, a pilot traveling 400 MPH and rising at an angle of 30° or a pilot traveling 300 MPH and rising at an angle of 40°?

How much more quicker (in MPH) does this pilot gain altitude?

c) The angle of elevation of the sun is 70°. A flagpole casts a shadow 15 feet long. Find the height of the flagpole.

d) A supporting wire stretches from the ground to the top of a television transmitting tower 200 feet high. The angle the wire forms with the ground is 75°. Find the length of the wire.

C3

Applications B
Measurement in Home Furnishings
Activity IIA-3.c.7
Perimeters

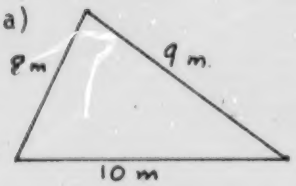
Name_____

Date_____ Pd._____

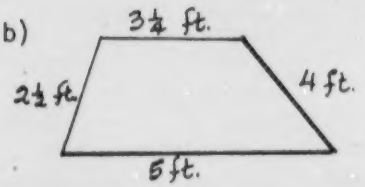
Score_____

1. Find the perimeter of each figure.

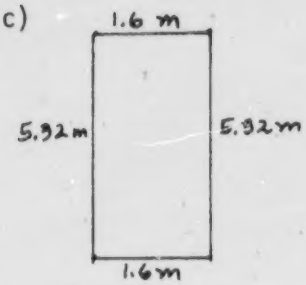
a)



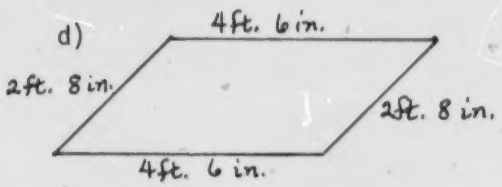
b)



c)



d)



2. Find the perimeter of each rectangle with the given length and width. Draw a diagram.

a) 28 ft., 23 ft.

b) 6 in., 1.5 ft.

c) 5.28 m, 7.39 m

d) 2 yd., 5 ft.

C4

3. Find the perimeter of each square with the given side.

a) $3\frac{1}{2}$ ft.

b) 99.5 m

c) $23\frac{1}{6}$ yd

d) 100.6 cm

4. Solve each word problem by first drawing a diagram.

a) A wallpaper border is to be applied around a room that is $20\frac{1}{2}$ feet long by $14\frac{1}{2}$ feet wide. How many feet of border are needed?

b) A garden is to be fenced completely by a chain link fence. The garden is 38.2 meters long by 28.1 meters wide. How many meters of fencing are needed?

C5

c) A square pen is to be built as a rabbit cage. The pen is 8.5 feet on each side. How many feet of fencing are needed?

d) A fringe is to be sewn around the outer edge of a bedspread that is 80 in. by 60 in. How many feet of fringe are needed? If fringe sells for $.98 a yard and is only sold in whole yards, how much will the fringe cost?

e) A picture that is 24 in. by 18 in. is to be framed with a $1\frac{1}{2}$ in. wide frame. How many inches of frame are needed to surround the picture, if you are to construct your own frame?

Applications B
Measurement in Home Furnishings
Activity IIA-3.c.8
Circles and Circumferences

Name_____

Date_____ Pd._____

Score_____

Circles are described by their radii. The radius is the distance from the center of a circle to a point on the circle. The diameter is twice the length of the radius. The circumference is the distance the circle travels in one revolution.

1. Name five objects which have the shape of a circle.

   a) d)

   b) e)

   c)

2. If a circle has the following radius, what is its diameter?

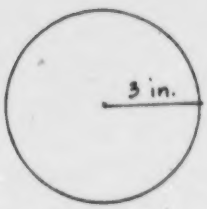
   a) r = 8 in. d=____ c) r = $2\frac{1}{2}$ ft. d=_____

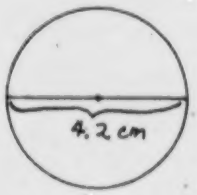
   b) r = 4.3 cm d=____ d) r = 5.25 in. d=_____

3. The formula for finding the circumference of a circle is $C = \pi d$ or $C = 2\pi r$, where π is approximately equal to 3.14 or $3\frac{1}{7}$.

   Find the circumference of each circle shown.

   a) Use $\pi = 3\frac{1}{7}$ b) Use $\pi = 3.14$ c) Use $\pi = 3\frac{1}{7}$





67

4. Solve each word problem by first drawing a diagram. Use 3.14 for π.

a) A wheel has a diameter of 28 in. How far does the wheel roll in one complete revolution?

b) A circular rug is 5 feet in diameter. How many feet of fringe are needed to border it?

c) A circular pool is to be surrounded by a low fence. If the radius of the pool is $3\frac{1}{2}$ feet, how many feet of fence are needed?

d) The famous Big Ben in London has clock faces that are 23 feet across. What is the circumference of each face?

Applications B
Measurement in Home Furnishings
Activity IIA-4.c.1
Similar Polygons

Name_____

Date_____Pd._____

Score_____

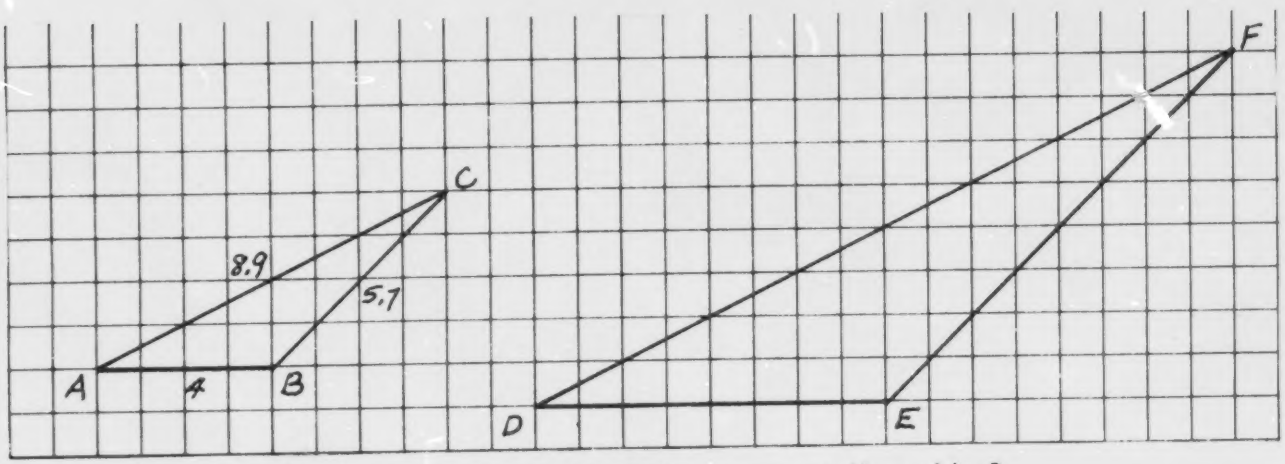
Reminder: Similar polygons have the same shape, three pairs of corresponding angles which are congruent and three pairs of corresponding sides which have the same ratio.

1. $\triangle ABC \sim \triangle DEF$. What is the ratio of the sides?

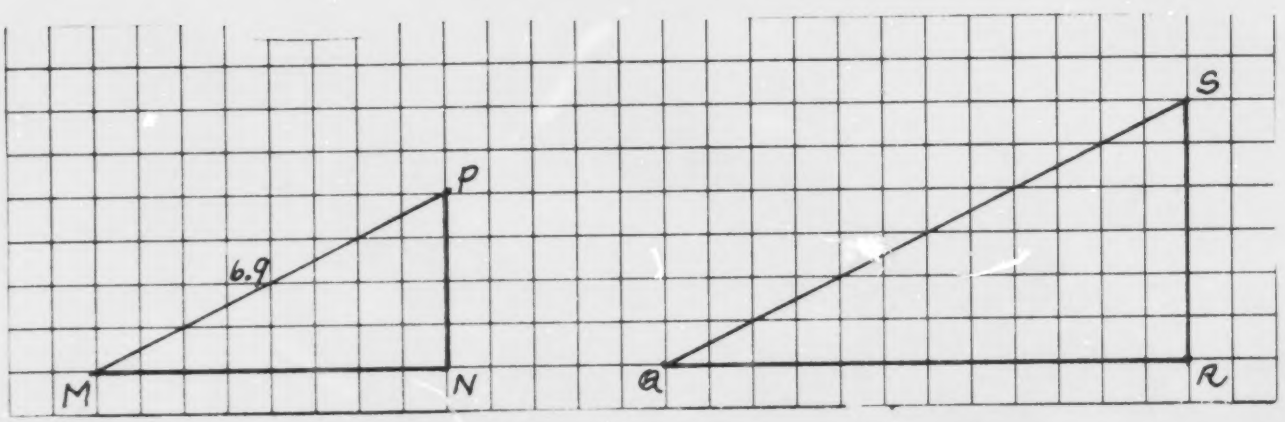
   Name the pairs of corresponding sides. _____,_____; _____,_____; _____,_____

   Name the pairs of corresponding angles. _____,_____; _____,_____;_____,_____

   Find the lengths of the sides of $\triangle DEF$.

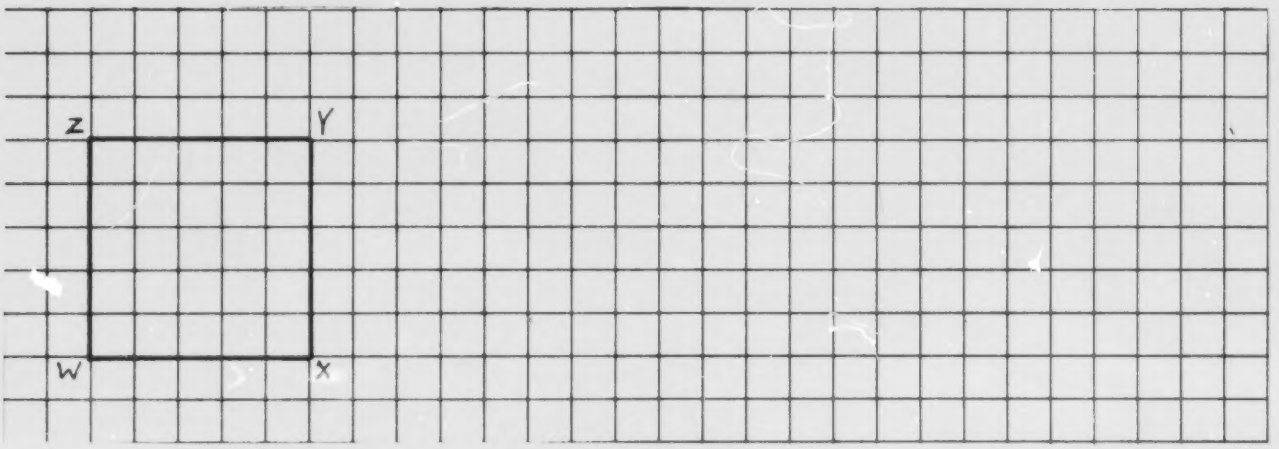


2. $\triangle MNP \sim \triangle QRS$. What is the ratio of the corresponding sides?_____
   Find the lengths of QR, RS, QS.

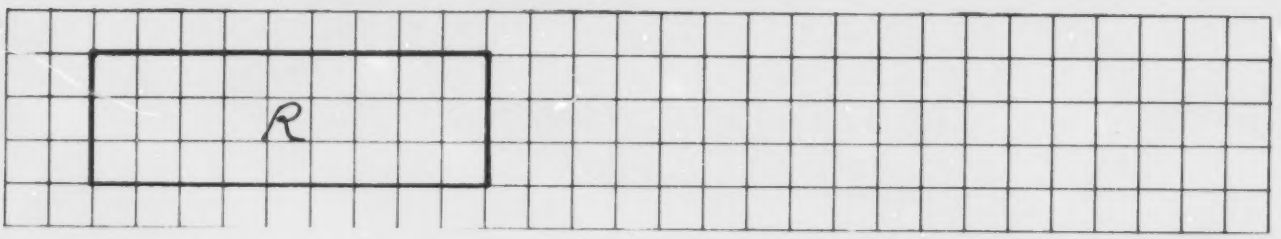


3. Given: Square WXYZ. Draw a square ABCD so that the sides of WXYZ and ABCD have a ratio of 2:3.

   What can you conclude about the similarity of squares?



4. Draw a rectangle P similar to rectangle R so the R:P = 3:1.



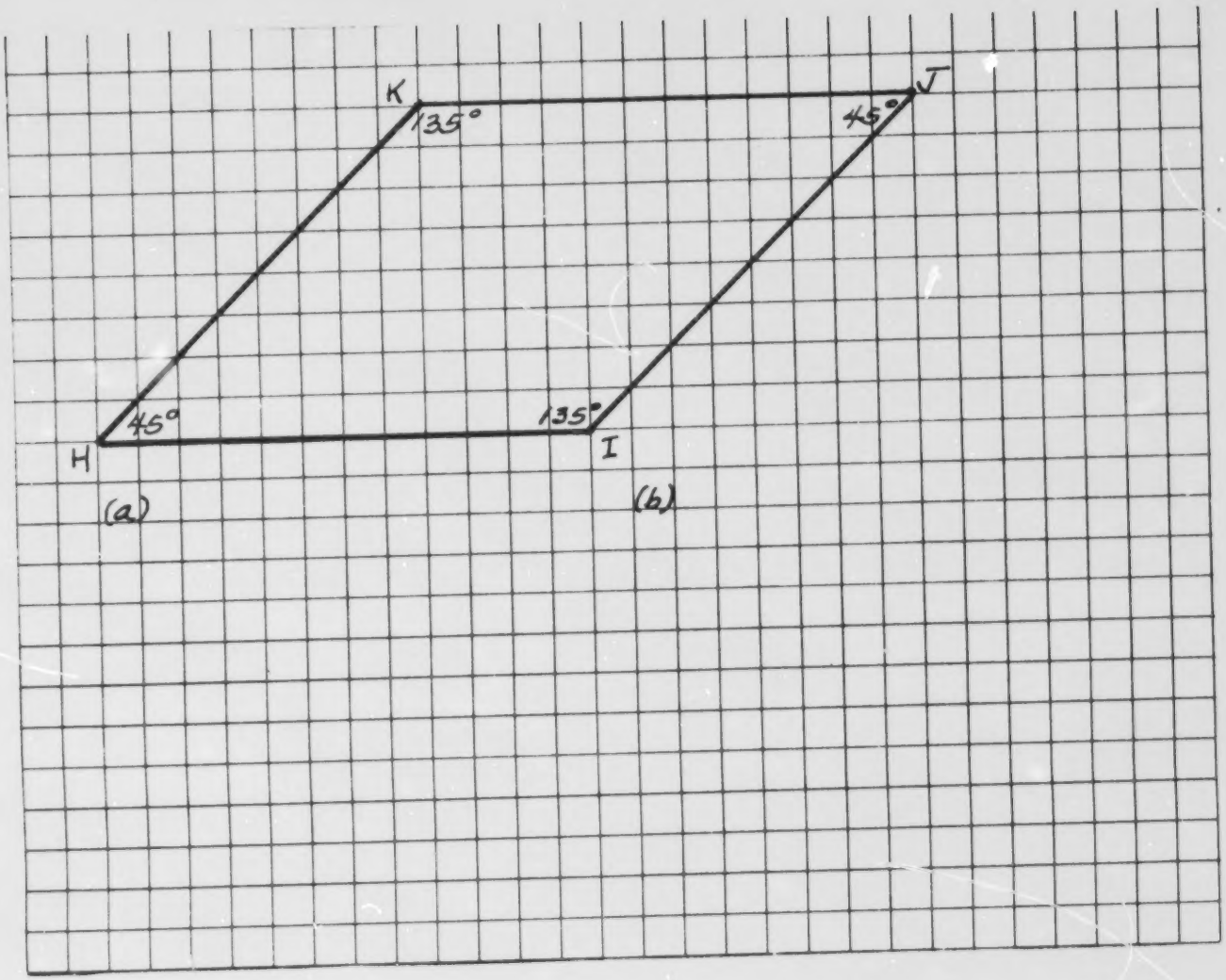
5. a) Given a parallelogram HIJK, draw a parallelogram ABCD which has sides half as long.

   What are the measures of ∠s A, B, C, D?_____

   b) Draw another parallelogram PQRS so that its sides are half as long as the sides of parallelogram ABCD.

   What are the measures of ∠s P, Q, R, S?_____

Use the diagram on the next page.


K
135°
J
45°
45°
H
135°
I
(a)
(b)

Applications B
Measurement in Home Furnishings
Activity IIA-4.c.4
The Classroom

Name_____

Date_____Pd._____

Score_____

Make a scale drawing of the classroom.

1. Measure each part of the room or item to be placed in the scale drawing and write the information on the sketch. Don't forget to measure the doors, windows, furniture, etc. Round off to the nearest half foot.

2. Decide on the scale that will give you a scale drawing that will reasonably fill the given grid.

3. Use the sketch to make your scale drawing.

SKETCH:

II. Measurement in Home Furnishings

B. Measuring with Square Units

1. Objectives

a. Knows square units.

b. Converts between different square units.

c. Computes the area of rectangles, squares and triangles.

d. Uses square roots.

e. Computes the area of a circle.

2. Comments

The students must be aware of the difference in measuring units for perimeter as opposed to area. They should also get a good idea of what area actually measures. This can be accomplished by starting the unit with activities using graph paper. Students should also be able to apply the floor plan exercise and area skills in fixing up one particular room.

3. Activities

a. Discuss measuring with squares. Use graph paper and have students estimate the number of squares lying within a given plane figure. Refer to exercises from the following pages.
MATHEMATICS FOR DAILY USE,
pp. 247-249, measuring with squares.

b. REFRESHER MATHEMATICS,
pp. 371-374, formulas for finding the area of rectangles, squares and triangles.

c. MATHEMATICS FOR DAILY USE,
pp. 255-257, converting within different square units.

d. Finding a Missing Dimension (pg. 69).

e. Applying Area Formulas (pg. 71).

f. Carpeting an Apartment (pg. 73).

g. Furnishing A Room (pg. 74).

h. Area of Circles (pg. 76).

i. ARITHMETIC SKILLS WORKBOOK,
pp. 201-205, converting square units.
pp. 205-207, computing area.

j. MATHEMATICS FOR DAILY USE,
pp. 251-254, area.
p. 273, carpeting.
pp. 278-280, area of circles.
p. 281, pizza activity.

k. REFRESHER MATHEMATICS,
pp. 366-370, converting square units.
pp. 275-277, area of circles.
p. 452, converting square metric units.

l. PRE-ALGEBRA WITH PIZZAZZ
pp. CC 35, 36, 38, 39, area of polygon.

Applications B
Measurement in Home Furnishings
Activity II B-3.d.

Finding a Missing Dimension

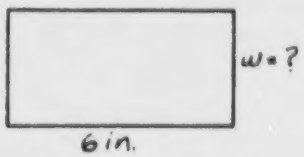
Name_____

Date_____ Pd._____

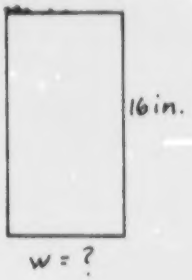
Score_____

1. Find the missing dimension of each rectangle, given its area.

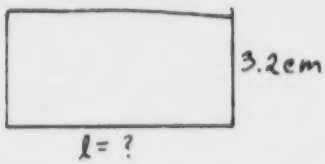
a) Area = 24 sq. in.



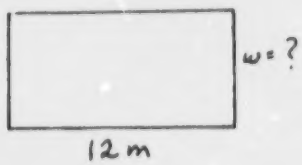
b) Area = 60 sq. in.



c) Area = 80 sq. cm



d) Area = 42 sq. m



2. Find the length of a side of a square given its area.

a) Area = 100 sq. in.

c) Area = 81 sq. km

b) Area = 36 sq. ft.

d) Area = 144 sq. cm

3. Estimate the length of the side for each square given its area. Use a square root table and round your answer to the nearest tenths.

a) Area = 44 sq. in.

c) Area = 88 sq. ft.

b) Area = 200 sq. cm

d) Area = 150 sq. mm

Applications B
Measurement in Home Furnishings
Activity II B-3.e.
Applying Area Formulas

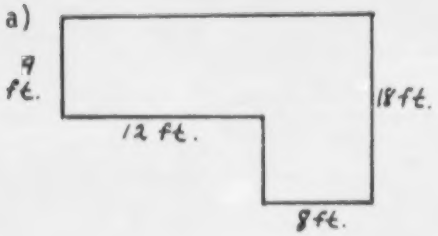
Name_____

Date_____ Pd._____

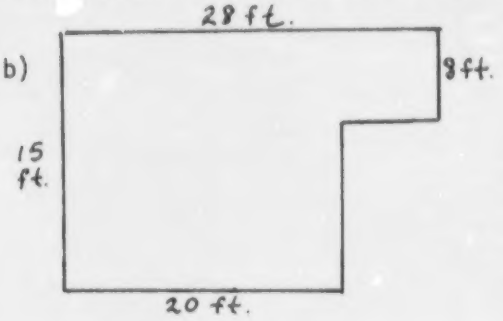
Score_____

1. Find the area of each figure in square feet. Each figure can be divided into two rectangles.

a)



b)



2. Assume each figure above is a floor plan of a room. The floor is to be covered with tiles that cost $1.39 per square foot. How much will it cost to tile each room?

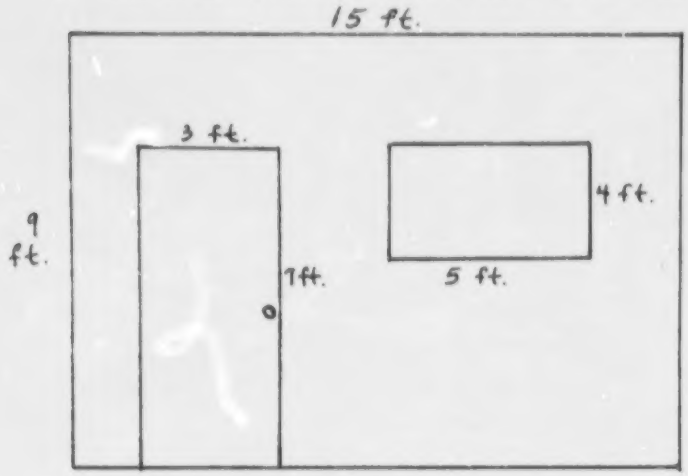
a)

b)

3. A gymnasium floor is to be covered with a sealer that covers 500 sq. ft. per gallon. If the floor is 80 ft. by 125 ft., how many gallons are needed?

4. A triangular bathtub is to be installed in a corner of a square room. If the two sides of the bathtub which touch the walls are each 5 feet long, what area of the floor does the tub cover?

5. The drawing below shows a wall with a door and a window.



Area of window _____

Area of door _____

Area of wall _____
(excluding door and window)

What is the area of the window?

What is the area of the door?

If the wall is to be painted, how many square feet of surface needs to be covered? (The door and window will not be painted.)

Applications B
Measurement in Home Furnishings
Activity II B-3.f.
Carpeting on Apartment

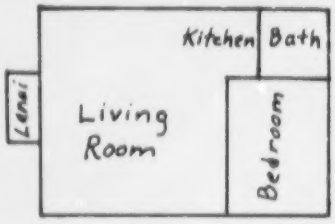
Name_____

Date_____ Pd._____

Score_____

Shown is the floor plan of a one bedroom condominium. Use a metric ruler to measure the dimensions of each room, then convert to yards using the floor plan scale.

1 cm = 2 yd.



From the floor plan, find the area of the following rooms.

Room	Length	Width	Floor Area
Bedroom	_____	_____	_____
Bathroom	_____	_____	_____
Living Room and Kitchen	_____	_____	_____
Lanai	_____	_____	_____

If the cost per square yard of carpeting in the interior of the apartment is $11.95 and cost of the outdoor carpeting is $7.95 per square yard, find the total cost of carpeting the entire apartment, including tax.

Room	Area (to next highest square yard)	Cost per sq. yard	Cost of carpeting
Bedroom	_____	_____	_____
Bathroom	_____	_____	_____
Living Room and Kitchen	_____	_____	_____
Lanai	_____	_____	_____
		Sub Total	_____
		Tax	_____
		Total Cost	_____

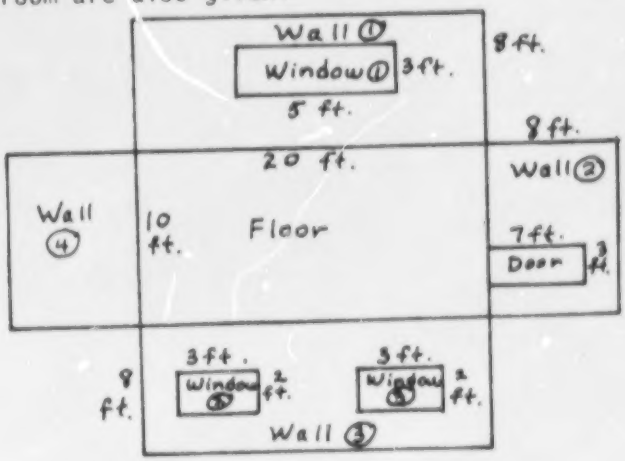
Applications B
Measurement in Home Furnishings
Activity II B-3.g.
Furnishing a Room

Name_____

Date_____Pd._____

Score_____

Drawn below is a diagram of the floor and four walls of a given room. The dimensions of the room are also given.



1. What is the height of this room?_____

2. What are the dimensions of the ceiling which is not pictured? ____by____

3. What is the area of the floor in square yards?_____

4. If the floor is to be carpeted at $12.95 per square yard, how much will it cost to carpet the floor (excluding tax)?

5. The cost of the material and sewing fee and installation fee for the drapery will be approximately $18.50 per square yard. Find the total area of all three windows in square yards. What is the approximate cost of the drapes for the three windows?

   Area of window 1_____

   Area of window 2_____

   Area of window 3_____

6. The walls, door and ceiling are to be painted in the same shade of blue. Find the area of the four walls and the ceiling (excluding windows).

Area of wall 1_____

Area of wall 2_____

Area of wall 3_____

Area of wall 4_____

Area of ceiling_____

Total Area_____

7. a) If one gallon of paint will cover about 150 square feet, how many whole gallons of paint will be needed?

b) If one gallon of paint costs $8.75 what will be the cost of the paint excluding tax?

8. Fill in the chart and compute the total cost of carpeting, drapery and paint.

	Cost
Carpeting	
Drapery	
Paint	
Sub Total	
Tax	
Total Cost	

Applications B
Measurement in Home Furnishings
Activity II B-3.h.
Area of Circles

Name_____

Date_____ Pd._____

Score_____

The formula for finding the area of a circle is $A = \pi r^2$, where r = radius and $\pi = 3.14$ or $\pi = \frac{22}{7}$.

1. Estimate the area of a circle whose radius is given. Use $\pi = 3$

   a) 5 cm Area = _____ c) 6 mm Area = _____

   b) 10 ft. Area = _____ c) 8 yd. Area = _____

2. Find the area of a circle whose radius is given. Use 3.14 for π.

   a) 20 ft. Area = _____ c) 29 mm Area = _____

   b) 1.4 m Area = _____ d) 16.1 in. Area = _____

3. Find the area of a circle whose radius is given. Use $\frac{22}{7}$ for π.

   a) 14 in. Area = _____ c) 2.8 cm Area = _____

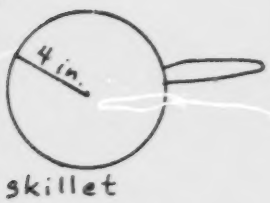
   b) 142 yd. Area = _____ d) 8.4 mm Area = _____

4. Find the area of the following circles. Use $\pi = 3.14$

a)

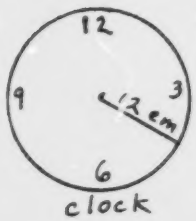
b)

c)



d)

e)



5. A jar lid has a radius of 3.5 cm. What is its area?

6. A circular rug has a diameter of 6 feet. What is its area?

7. A circular window pane, 100 cm. in diameter is cut from a square piece of glass that is 100 cm on a side. How much glass is wasted?

II. Measurement in Home Furnishings

C. Measuring with Cubic Units

1. Objectives

a. Knows cubic units.

b. Converts between different cubic units.

c. Computes volumes of rectangular solids.

2. Comments

Students should get a feel about what volume actually measures. If sets of cubes are available in your department, they can be used to introduce the concept of volume. The student will be able to count the number of cubes in one layer and use this information to find the total number of cubes in a rectangular solid. The student should also be made aware of the relationship between different cubic units. For example, how does a cubic foot compare to a cubic inch?

3. Activities

a. Discuss measuring with cubes. Use a set of cubes if available. MATHEMATICS FOR DAILY USE, pp. 396-398.

b. Converting Cubic Units (pg.79).

c. Volume of Rectangular Solids (pg.81).

d. Volume Word Problems (pg. 83).

e. Using Volume in Air Conditioning (pg.84).

f. ARITHMETIC SKILLS WORKBOOK,
pp. 208-211, cubic units.
pp. 211-213, volume.

g. MATHEMATICS FOR DAILY USE,
pp. 399-402, volume.
pp. 403-405, equivalent volumes.

h. PRE-ALGEBRA WITH PIZZAZZ,
pp. CC 42-43, volume of rectangular solids.

i. REFRESHER MATHEMATICS,
pp. 382-384, converting customary square units.
pp. 385-389, volume.
pp. 452-453, converting metric square units.

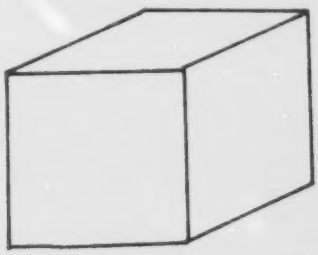
Applications B
Measurement in Home Furnishings
Activity II C-3.b.
Converting Cubic Units

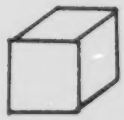
Name_____

Date_____Pd._____

Score_____

The amount of space that a solid contains is called its volume. Volume is usually measured in cubic units. A cube that is 1 inch long, 1 inch wide and 1 inch high is called a cubic inch. Other common units of volume are the cubic foot, cubic yard, cubic meter and cubic centimeter.

1 cubic inch 

1 cubic centimeter 

1. How many cubic inches are there in a cubic foot?_____

2. How many cubic feet are there in a cubic yard?_____

3. How many cubic centimeters are there in a cubic meter? _____

4. Change each volume to cubic yards. Show your computation.

   a) 54 cubic ft. = _____cu. yd. c) 100 cu. ft. = _____cu. yd.

   b) 162 cu. ft. = _____cu. yd. d) 500 cu. ft. = _____cu. yd.

5. Change each volume to cubic feet.

   a) 6 cu. yd. = _____cu. ft. c) $2\frac{1}{2}$ cu. yd. = _____cu. ft.

   b) 10 cu. yd. = _____cu. ft. c) $3\frac{1}{3}$ cu. yd. = _____cu. ft.

6. Change each volume to cubic inches.

a) 2 cu. ft. = _____cu. in.

c) 0.5 cu. ft. = _____cu. in.

b) 4 cu. ft. = _____cu. in.

d) 3.45 cu. ft. = _____cu. in.

7. Change each volume to cubic meters.

a) 500 cu. cm = _____cu. m

c) 450 cu. cm = _____cu. m

b) 6000 cu. cm = _____cu. m

d) 10,450 cu. cm = _____cu. m

Applications B
Measurement in Home Furnishings
Activity II C-3.c.
Volume of Rectangular Solids

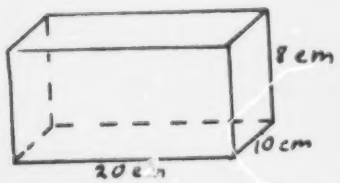
Name_____

Date_____ Pd._____

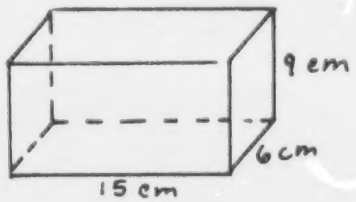
Score_____

1. How many 1 cm cubes would it take to fill each solid. HINT: Find the number of cubes that will fill one layer.

a)

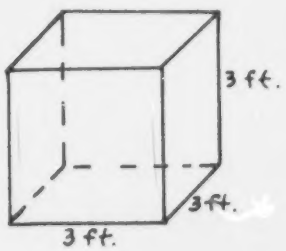


b)

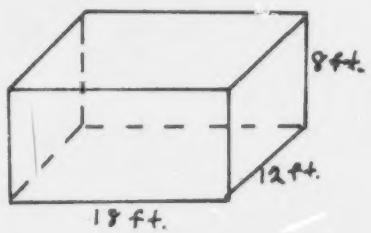


2. How many 1 ft. cubes would it take to fill each solid below.

a)



b)



3. The area of the base tells how many cubes are in one layer. To find the volume of a rectangular solid, multiply the area of the base times the height. This will tell you how many cubes are in the entire solid.

Volume = Area of Base x height

V = Bh

Use the formula to find the volume of each rectangular solid.

a) B = 9 sq. ft., h = 6 ft.

c) B = 8 sq. cm, h = 4 cm

b) B = 7 sq. m, h = 9 m

d) B = 6 sq. mm, h = 2 mm

87

4. Find the area of each base of the solid. Then find the volume.

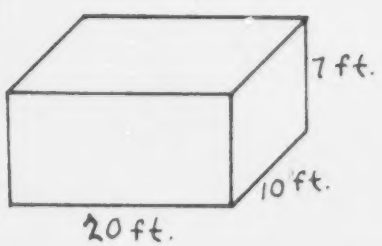
a) B = _____, h = _____, V = _____

b) B = _____ , h = _____, V = _____

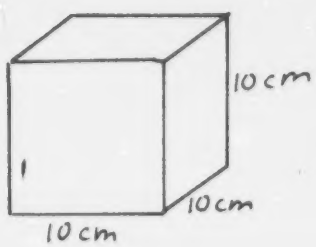
c) B = _____, h = _____, V = _____

d) B = _____, h = _____, V = _____

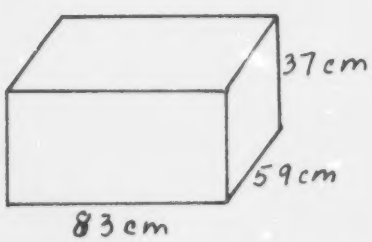
a)



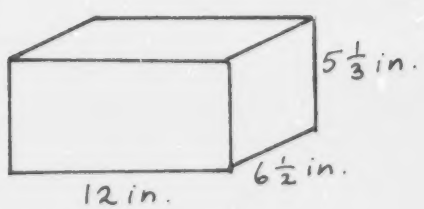
b)



c)



d)



Applications B
Measurement in Home Furnishings
Activity II C-3.d.

Name_____

Date_____ Pd._____

Volume Word Problems

Score_____

1. An aquarium is 12 inches wide, 30 inches long, and 15 inches high. What is its volume?

2. A contractor is digging a basement that is 20 feet wide, 34 feet long and 8 feet deep. How many cubic feet of dirt must be removed?

3. A driveway is 8 feet wide and 25 feet long. It is covered with a concrete slab that is 6 inches deep. How many cubic feet of concrete are needed for the driveway?

4. A classroom is 35 feet long, 20 feet wide and 9½ feet high. How many cubic feet of airspace are in the classroom?

5. A concrete patio is 18 feet long, 10 feet wide and 6 inches deep. How many cubic yards of concrete are needed for the patio?

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Applications B
Measurement in Home Furnishings
Activity II C-3.e.
Using Volumes in Air Conditioning

Name_____

Date_____ Pd._____

Score_____

In order to air condition a home or apartment adequately the volume of air space in each room and the total volume of the home must be known.

1. Find the total volume of the apartment whose dimensions are given. (Express your answer in cu. ft.)

Room	Length	Width	Height	Volume
Living Room	20 ft.	15 ft.	8 ft.	
Kitchen/Dining	10 ft.	12 ft.	8 ft.	
Bedroom	15 ft.	15 ft.	8 ft.	
Bathroom	10 ft.	6 ft.	8 ft.	
			Total	

2. Calculate the total air space in you own classroom. Measure and round off the dimensions of your classroom to the nearest foot and record your results. Then compute the volume of the room in cubic feet.

	Length	Width	Height	Volume
Classroom				

3. Estimate to the nearest foot the dimensions of the given four rooms of your own home. Write all information in the chart and calculate the volume of each room.

Room	Length	Width	Height	Volume
Living Room				
Kitchen				
1 Bedroom				
1 Bathroom				
			Total	

II. Measurement in Home Furnishings

D. Buying Home Furnishing

1. Objectives

a. Uses the relationship among common fractions, decimals and percents.

b. Finds percents of numbers.

c. Computes the cost of an item bought at discount.

2. Comments

Since major items in the home are expensive, it is wise practice to buy them when they are sold at discount. Many personal items which the students use can also be bought at a discount. Percents were covered in the section on Computing sales tax. The percents in this section is an extension of the previous material.

3. Activities

a. REFRESHER MATHEMATICS,
pp. 223-231, relationship among percents, fractions, and decimals.

b. REFRESHER MATHEMATICS,
pp. 232-237, exercises and problems on percents.

c. CONSUMER MATHEMATICS,
pp. 99-101, finding rates of discounts.

d. Compute Discounts (pg. 87).

e. Which is the Better Discount? (pg.89)

f. Shortcut on Calculating Sale Price (pg.90).

g. Using ads found in newspapers of sales with discounts given in percents, find the amount of discounts, sales tax and total prices.

h. ARITHMETIC SKILLS WORKBOOK,
pp. 299-300, computing discounts.
pp. 181-183, finding percent of numbers.

i. CONSUMER MATHEMATICS,
pp. 102-105, discounts on clothes.

j. CONSUMER MATHEMATICS,
pp. 102-105, discounts on clothes.

k. MATHIMAGINATION,
p. E 45, Finding Percentages.
p. E 47, Discounts.

l. PRE ALGEBRA WITH PIZZAZZ,
p. BB 43, discounts.

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Applications B
Measurement in Home Furnishings
Activity II D-3.d.
Compute Discounts

Name_____

Date_____ Pd._____

Score_____

Show computations on another sheet of paper and attach.

1. Find each answer.

   a) 15% of $50 = _____

   b) 25% of $75 = _____

   c) 20% of 30 = _____

   d) 35% of 50 = _____

2. Find the amount of discount.

   a) $15.00 pants; 20% discount: _____

   b) $25.00; 15% discount: _____

   c) $33.00; 30% discount: _____

3. A store has a discount of 10% on every item for Senior Citizens on Tuesdays. Complete the following table.

Item	Regular Price	Amount of Discount	Sale Price	Sales Tax	Total Cost
can opener	$ 12.95	10%	a.		
TV set	$759.00	20%	b.		
rice warmer	$ 62.00	15%	c.		
microwave oven	$529.00	15%	d.		

4. Mrs. Kauhane refurnished part of her home and she tried to get the best buy for her money so she shopped around and made the following purchases.

a) Drapes, 25% discount
Regular price, $645

Show Computations Here

Amount of Discount _____

Sale Price _____

4% Sales Tax _____

Total Cost _____

b) Carpet, 15% discount
Regular price, $12 per sq. yd.
Bought 42 sq. yd.

Total Regular Price _____

Amount of Discount _____

Sale Price _____

4% Sales Tax _____

Total Cost _____

c) Washer and Dryer, 20% discount
Washer, $399; Dryer, $366

Cost of Washer and Dryer _____

Amount of Discount _____

Sale Price _____

4% Sales Tax _____

Total Cost _____

5. Find an ad in the newspaper of an item on sale at a discount and find its cost as in Exercise 4 above.

Applications B
Measurement in Home Furnishings
Activity II D-3.e
Which is the Better Discount?

Name_____

Date_____Pd. _____

Score _____

Circle the better discount.

1. 30% off or $\frac{1}{3}$ off
2. 50% off or one-half off
3. 20% off or $\frac{1}{4}$ off
4. less 25% or $\frac{1}{4}$ % off
5. 10% off or one-eighth off
6. 5% off or less 0.5%

Show your computations and circle the better discount.

7. 25% off or $\frac{1}{3}$ off on a dinette set costing $1,000.00

8. $\frac{2}{5}$ off or 35% off on a $556 microwave oven

9. 20% off or $100 off on an electric range that costs $539.00

10. $35 off or 20% off on a $149.99 electric stand fan

Applications B
Measurement in Home Furnishings
Activity II D-3.f
Short Cut in Calculating Sale Price

Name_____

Date_____ Pd._____

Score_____

In calculating sale price, it sometimes is easier to figure out % to be paid instead of % off. In other words, 10% off means that you have to pay 90% of the regular price. For example, if a stereo system costs $600 and there is a discount of 20%, then you end up paying 80% of the $600.

$600 x 80% = 600 x0.8

= $480 sale price

$600 x 20% = 600 x 0.2
= $120 off the regular price

Regular price:	$600
Less discount:	- 120
Sale Price:	$480

The prices are the same, but you are doing a lot less calculating!

Use a calculator.

	% Discount	% to be Paid	Regular Price	Sale Price
1.	10%		$ 540.00	
2.	15%		700.00	
3.	5%		24.99	
4.	20%		9995.00	
5.	12.5%		100.00	
6.	0.5%		55.00	
7.		45%	50.00	
8.		60%		$48.00
9.		75%		$300.00
10.		90%		$180.00

III. Measurement in Utilities

A. Using Electricity

1. Objectives

a. Reads and interprets an electricity bill.

b. Calculates the kilowatt hours (KWH) used and cost of KWH in the home.

c. States the "hidden" costs of electricity consumption.

2. Comments

The HAWAIIAN ELECTRIC COMPANY - AT YOUR SERVICE is a pamphlet that is used as a reference for this unit. The pamphlet is available at the main office. The questions are based on the readings from the pamphlet. The Electric Company has a listing of available services to intermediate and high schools which can be obtained by calling the public relations office of Hawaiian Electric Company. Teachers on the other islands, contact your respective companies.

3. Activities

a. CONSUMER AND CAREER MATHEMATICS,
pp. 200-201, reading the meter.

b. An Electricity Bill (pg.92). Use the sample in the pamphlet to answer the questions on the worksheet.

c. Computes the KWH used and the cost of consumption.
Worksheet: Counting KWH Used in the Home.
BUSINESS MATHEMATICS, pp. 468-470, calculates the cost of electricity.
CONSUMER AND CAREER MATHEMATICS, pp. 202, calculators used in computations.

d. The Family of Kilo W. Hawaii (pg. 95). Students will compute the cost of electricity consumption for a family of four. Graph the results for a year on a line graph.

Applications B
Measurement in Utilities
Activity III A-3.b
An Electricity Bill

Name_____

Date_____ Pd._____

Score_____

This is an enlargement of an electricity bill.

HAWAIIAN ELECTRIC COMPANY, INC.

P.O. Box 3978 · Honolulu, Hawaii 96813
Telephone 548-7311

(Return Postage Guaranteed)

TWO MONTH RESIDENTIAL

Service Address			020	Multiplier 1
1979 ALA ALOHA 103				
MR. MACHO KANE			Bill Demand (Capacity) Demand Read	
From Service 4-27	To 6-27-79	Days 61		
Meter Reading 30880	31593	KWH 713	Current Charge 40.48	
Fuel Oil Adjustment			6.77	
Total Current Bill			47.25	
Your Account Number 68 123 456 78		Rate R	Total Amount Due 47.25	

RETAIN THIS PORTION FOR YOUR RECORDS

Use the sample bill and the pamphlet to answer the following questions:

1. How often are you billed for electricity?

2. What are some of the "hidden" costs in your bill?

3. Who determines the rate that Hawaiian Electric can charge for its service?

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4. Where can you pay your bill?

5. What are some reasons when the company can discontinue service?

6. What does KWH stand for?

   1 KWH = _____

7. What period does the bill cover? Date: _____

   Number of days: _____

8. What is the meter reading at the end of the period? _____

   What is the meter reading at the beginning of the period? _____

   What is the total number of KWH used? _____

9. Check to see that the current charges are correct.

Total Charge:	_____	
less Customer Charge:	_____	
Balance:	_____	
less Fuel Oil Adjustments:	_____	
Balance:	_____	
less First 200 KWH @ 5.3¢:	_____	200 x 5.3¢ = _____
Balance:	_____	
less Next 400 KWH @ 4.7¢:	_____	400 x 4.7¢ = _____
Balance:	_____	
less Next 600 KWH @ 3.7¢:	_____	113 x 3.7¢ = _____
Balance:	_____	
less All Additional KWH @ 4.1¢:	_____	
Balance:	_____	

10. What is the fuel oil adjustment charge for?

11. What does a customer charge include?

12. What is the total due to Hawaiian Electric Company?

13. What is the account number?

14. Which side of the bill do you return with your payment?
(You may need to look at one of your family's bills in order to answer this.)

15. What does "Presorted First Class" mean?

16. What does "Return Postage Guaranteed" mean?

17. If you were to mail in your payment, to what address would you mail it?

Applications B
Measurement in Utilities
Activity III A -3.c
Counting KWH in the Home

Name_____

Date_____Pd._____

Score_____

Istructions:

1. List the different electrical appliances you have in your home. Record the appliances in the table.

2. Use the table on page 12 and 13 of the AT YOUR SERVICE pamphlet to figure out how many KWH your family consumes.

3. The chart is calculated for a family of four. Figure out by what factor you have to multiply to make adjustments for your family.

   Multiply by a factor of _____.

Appliance	KWH/month For 4	KWH/year	KWH/year For my family

Total KWH used by my family of _____ people for one year is _____.

CALCULATIONS: (Use separate sheet for additional calculations.)

Applications B
Measurement in Utilities
Activity III A-3.d.
The Family of Kilo W. Hawaii

Name_____

Date_____Pd._____

Score_____

Given the following information calculate the current charges for the Hawaii family. Use the rate chart from the pamphlet.

From.... To....	Meter Reading	KWH	Total Charges
1/20 to 3/20	30880 31633		
3/20 to 5/20	31633 32243		
5/20 to 7/20	32243 33038		
7/20 to 9/20	33038 33637		
9/20 to 10/20	33637 34297		
10/20 to 12/20	34297 35299		

Calculations:

III. Measurement in Utilities

B. Using Water

1. Objectives

a. Reads and interprets a water bill.

b. Calculates the cost of water consumption.

c. States the "hidden" costs of water consumption.

2. Comments

The rate schedule is available at the main office of the Board of Water Supply. There are other resource materials available.

3. Activities

a. A Water Bill (pg.98). Students should be familiar with a bill after going through the electricity bill. Stress that the unit of measure is in thousand gallons.

b. How Much Does Water Cost?
These exercises from BUSINESS MATHEMATICS, pp. 462-465, are on calculating the cost of water consumption. Use the rates as established by the Board of Water Supply to give the students experience in calculating different amounts for water consumption.

c. You may want to contact the Board of Water Supply to inquire about their tours to the underground wells.

Applications B
Measurement in Utilities
Activity III B-3.a
A Water Bill

Name _____

Date _____ Pd. _____

Score _____

This is an enlargement of the water bill. You should bring in a bill of your family's also.

BOARD OF WATER SUPPLY
City and County of Honolulu/630 S. Beretania St.
Honolulu, Hawaii 96843
ADDRESS CORRECTION REQUESTED

1234 HIBISCUS CIRCLE
Service Location

SHIRLEM-HO ALOHA K (Service Holder)			005-123450 (Service Number)		
942 (Current Reading)	922 (Previous Reading)	20 (Thousand Gals)	1 1 (W) Codes		02 (Mtr.Size)

Service From 01-15 To 03-14-9 | 1100001B (Sewer Code)

WATER REGULAR CHARGES		16.70
PAST DUE		
SURCHARGES		
SEWER CURRENT CHARGES		9.70
PAST DUE		
Allotment is	000 gals.	26.40
Exceeded by	000 gals.	
Next Allotment	000 gals.	TOTAL AMOUNT PAYABLE

Retain this portion for your records.

Use the above water bill to answer the following questions.

1. What is the address of the Board of Water Supply?

2. Who is the receiver of the water service?

3. Where is the location of the receiver?

4. What is the service number? Why is there a service number?

5. What are the meter readings for End of period:_____

Beginning of period:_____

Total Consumption:_____thousand gals.

6. For what period does the bill cover? From:_____To:_____

Number of days:_____

7. What are you charged for the water consumed?

8. What is the sewer charge?

9. What is the total amount of the bill?

*10. How long a period do you have in which to pay the bill?

*11. What date will this bill be past due on?

*12. When can they turn off the water for non-payment of the bill?

13. What is the total consumption of your family?

14. What are the sewer charges for you family?

15. Do all the members of the class have a sewer charge? Why or why not?

* You have to refer to the back of the bill from your home.

III. Measurement in Utilities

C. Using the Telephone

1. Objectives

a. Reads and verifies a telephone bill.

b. Uses the tables for long distance rates in the telephone directory.

c. Locates the area codes of specific cities and/or countries.

d. Calculates the cost of long distance calls.

e. Computes the 3% Federal Excise Tax.

2. Comments:

Have the directories at the school saved for use in the unit. If you need the rates, you could check with the Phone Marts for information on rates, cost of different instruments, etc.

Review computing taxes.

Students may need an explanation of the different time zones in relation to our own time zone. You may want to discuss this in class so the student can realize what time it is if they cross a different zone.

3. Activities

a. A Telephone Bill (pg. 10). Use the explanation in the directory to aid the students. Have the students bring in their family's bill for discussion. You may want them to answer the questions pertaining to their own bill.

b. Long Distance Rates and Area Codes (pg.104). Students will need to read the charts in the directory and become familiar with the time differences.

c. How Much Does the Call Cost? (pg.106) Students will calculate the total cost of calls placed to a variety of places at different times of the day. Be careful of calls that change rates during the call.

Applications B
Measurement in Utilities
Activity III C-3.a
A Telephone Bill

Name_____

Date_____Pd._____

Score_____

Use the enlarged bill and the sample statement in the green pages of the directory to answer the questions.

HAWAIIAN TELEPHONE

1177 Bishop St. Honolulu, HI. 96813
----Business Office Telephone 537-7111

----Jul 16 1979 Waipahu 677-0000

John Q. Public
123 Farrington Highway
Apartment 1Z
Waipahu, HI. 96797

Previous Bill		20.39
Payment		.00
Balance		20.39
Jul 16 Local Service to Aug 16-79		12.90

Date	Calls to	Telephone #	Min	CT	From	Time	
Jun 09	Hana	808-455-0001	12	BO		505PM	2.40
Jun 13	Lihue	808-244-1234	2	KO		756AM	.90
Jun 17	Wailua	808-822-0000	10	BO		450PM	2.00
Jun 22	Hilo	808-988-4321	2	SO		644PM	.75
Jun 22	Kona	808-122-1010	7	SO		815PM	1.75
Jul 07	Denver SW	303-988-0000	10	BO		1005AM	2.46
Jul 10	Kahului	808-677-1000	13	SO		701PM	3.25
Total Long Distance Charges					13.51		
3.00% Federal Excise Tax				on	26.41		.79

Please pay before Jul 26. Charges not paid 15 days from bill date are past due. Amount Due 47.59

Payments made but not shown on this bill should be deducted from amount due before paying balance if not paid is past due.

1. What is the address of Hawaiian Telephone?

2. When was the statement dated?

3. What area is the service to?

4. What is the phone number of the person billed? _____

5. What is the address of the phone user? _____ _____

6. How much was the last bill? _____

7. Was the last month's bill paid?_____ If yes, when?_____

8. What are the charges for the month?_____

9. Were there any long distance calls?_____If yes, how many?___ _____

10. Compare the dates of the long distance calls and the dates of the local charges of the bill. Why are the dates different?

11. What is the area code for Hawaii?_____

12. What state has area code 303?_____

13. Is there a balance due from the previous month?_____If yes, How much?_____

14. The following questions refer to the call placed on June 17.

    a. What state was this call made to?_____

    b. What is the number called?_____

    c. How long did the call last?_____

    d. At what time was the call placed?_____

    e. At what time was the call received?_____

    f. At what rate was the caller charged?_____

    g. How much did the caller have to pay for the first minute?_____

       For each additional minute?_____

    h. What was the total charge for the call? (Include the tax.)_____

15. What is the total amount for long distance calls?

16. What is the total amount for the month?

17. What is the tax?

18. How much is the total amount due to the phone company for the month?

19. How long a period do you have from the date of the bill to pay?

20. By what date should you pay the bill by?

21. On what date will the bill be "past due"?

Applications B
Measurement in Utilities
Activity III C-3.b.
Long Distance Rates and Area Codes

Name_____

Date_____ Pd._____

Score_____

Instructions: Refer to the telephone directory. Fill in the following chart.

OUT OF STATE Station to Station

Place	Time	Day	Direct Dial		Operator Assist	
			First Min.	Add'l Min.	First Min.	Add'l Min.
Kansas	10:00 AM	Tuesday	a.			
El Paso	1:00 AM	Saturday	b.			
Reno	5:00 PM	Wednesday	c.			
San Francisco	6:00 AM	12/25	d.			
Los Angeles	10:00 PM	1/1	e.			
Juneau	5:05 PM	Sunday	f.			
New York City	1:30 AM	Sunday	g.			

IN STATE

Place	Time	Day	Station-Station		Person-Person	
			First Min.	Add'l Min.	First Min.	Add'l Min.
Hilo	7:30 AM	Monday	h.			
Wailuku	5:30 PM	Tuesday	i.			
Lihue	10:01 AM	Saturday	j.			
Kaunakakai	11:00 PM	Friday	k.			
Hana	8:30 PM	Wednesday	l.			

1. How much of a discount do you have if you placed a call at 5:30 PM instead of 4:30 PM on an inter-island call on the weekend?

   What if you placed the call on a week day?

2. How much of a discount do you have if you placed a call at 9:00 PM instead of 4:30 PM for an inter-island call on a week day, station to station?

3. Is it cheaper to call the mainland or call inter-island?

Find the Area Codes for:

City	State	Area Code
Honolulu	m.	
Waipahu	n.	
Los Angeles	o.	
Des Moines	p.	
Chicago	q.	
Washington, D. C.	r.	
Salt Lake City	s.	
Juneau	t.	

Applications B
Measurement in Utilities
Activity III C-3.c.
How Much Does the Call Cost?

Name_____

Date_____Pd._____

Score_____

Use the tables in the telephone directory to calculate the cost of the following. Be sure to add the 3% Federal Excise Tax. Show all calculations.

1. A direct dial, person to person call placed to Hilo, Hawaii at 4:50 PM on Friday and lasting until 5:01 PM.

2. Mrs. O'Hana placed a direct dial, station-to-station call,to Hana at 12:01 PM on Saturday and talked until 12:11 PM.

3. Mr. LoLo placed a call to Chicago, Illinois on Wednesday at 5:05 PM and charged it to his credit card. The call lasted 10 minutes.

4. You called American Samoa at 11:00 AM on Saturday. How much did you have to pay for the call that lasted three minutes, station to station?

5. Mr Sato called Tokyo, Japan and dialed direct.

   What is the country code?_____ What is the city routing code?_____

   What International access code would he use?_____

   How much would a 10 minute call cost on Monday?

6. Teresita called Grandma in Manila, Philippines at 4:30 PM on Monday and talked for 5 minutes. How much did she have to pay for the call if she called station to station?

7. Brother Kimo called New York City on Monday at 4:58 PM, station to station, direct dial and talked for 10 minutes. How much did he have to pay for the call?

III. Measurement in Utilities

D. Graphing Utility Charges

1. Objectives

a. Graphs the utility costs on a line graph for water and electricity.

b. Selects appropriate units of measure for the axis of the graphs.

c. Fills in a table of values to be plotted.

d. Collects data and decides what information is necessary for the line graph.

2. Comments

The intent of this exercise is to familiarize the student with the idea of how a change in rates will affect the cost of the utility. A step graph could also be used to graph the cost per unit of consumption.

3. Activities

a. Gathering Data (pg.109). Each student should complete his/her own sheet.

b. Graphing the Charges (pg.110). Use the data collected and the information in the previous sections in this unit.

Applications B
Measurement in Utilities
Activity III D-3.a.
Gathering Data

Name_____

Date_____Pd._____

Score_____

Fill in the following blanks.

Number of people in my family _____

I. Electricity

Number of KWH consumed_____ from_____to_____.

Does your family have the following? (Circle yes or no.)

Electric range	yes	no
Electric heater	yes	no
Clothes dryer	yes	no
Air conditioner	yes	no
Refrigerator:		
Manual defrost	yes	no
Frostfree	yes	no
Freezer:		
Manual defrost	yes	no
Frostfree	yes	no
Dish washer	yes	no

II. Water

Number of thousand gallons consumed_____from _____to_____.

Sewer Charge _____

III. Telephone

Number of extensions _____

Type of phone(s)_____

Amount of long distance charges_____

Amount for local service_____

Total bill_____

Applications B
Measurement in Utilities
Activity III D-3.b.
Graphing the Charges

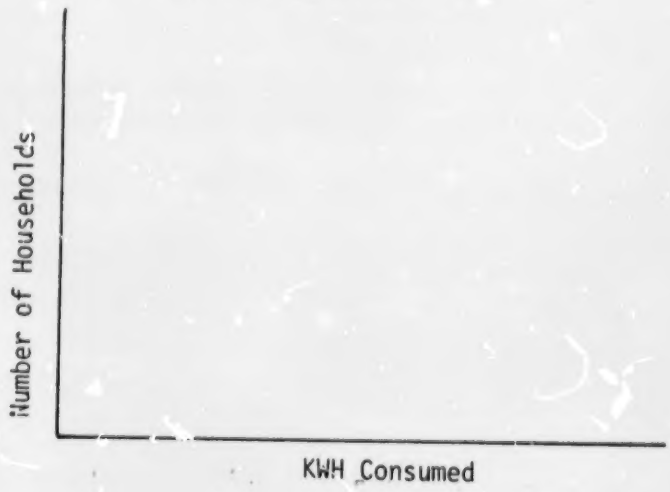
Name_____

Date_____ Pd._____

Score_____

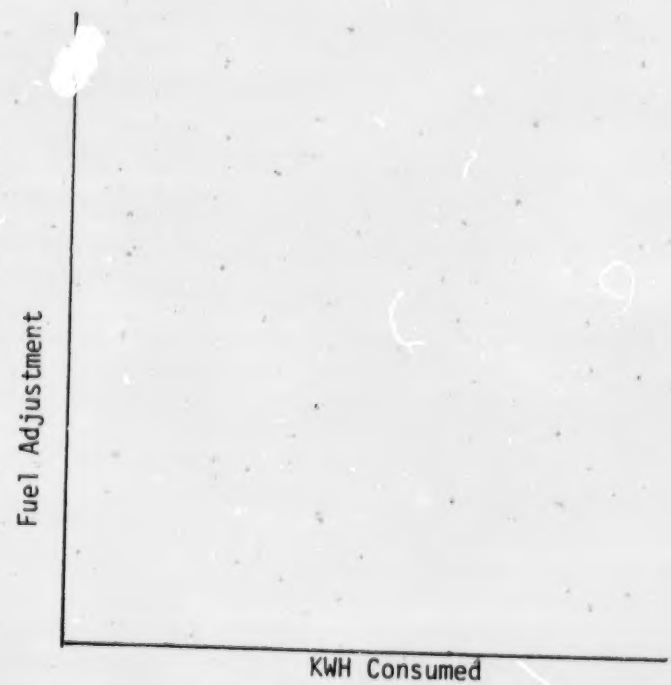
I. Graph the KWH consumed per household. Fill in the table first.

KWH Used	# of Households



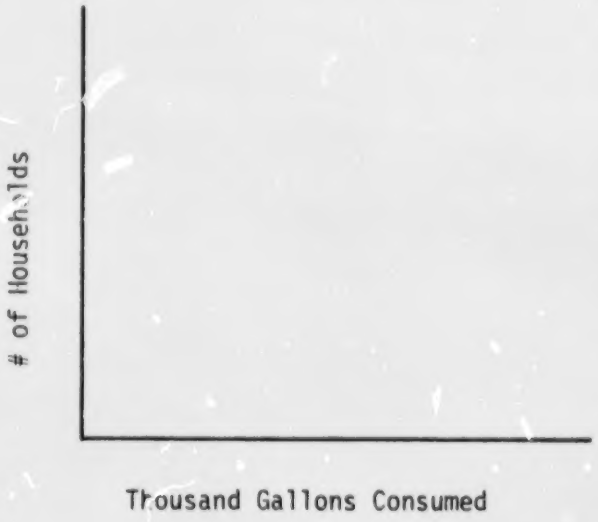
II. Graph the fuel adjustment charges (round to the nearest dollar) per KWH used.

KWH Used	Fuel Adjustment



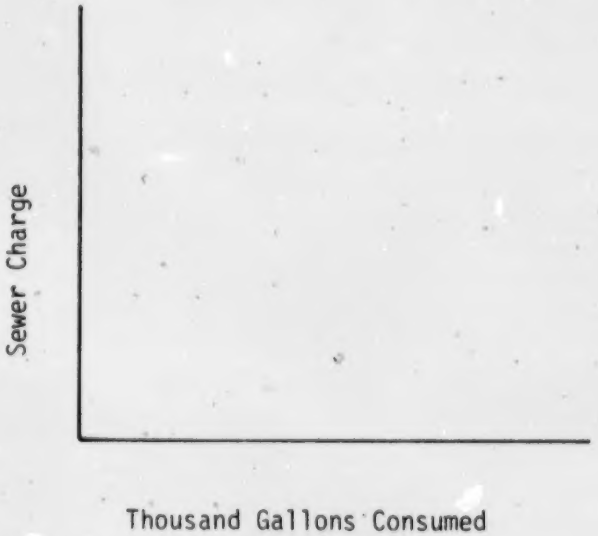
III. Graph the amount of water consumed per household.

1000 gal. | # of Households



IV. Graph the sewer charges (round to the nearest dollar) per thousand gallons of water consumed

1000 gal. | Sewer Charge



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V. Graph the total charge for KWH consumed.

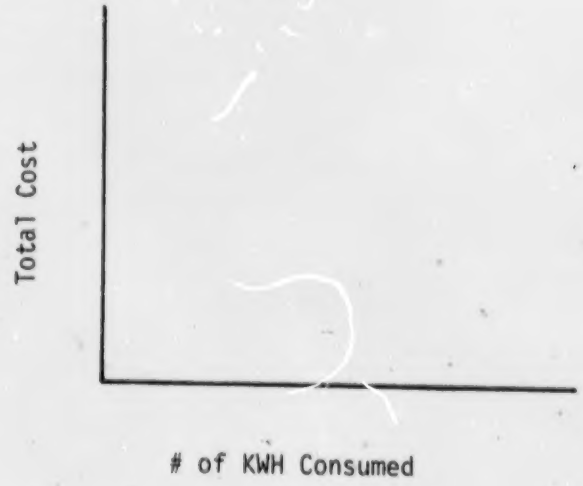
Rate Schedule:

Customer Charge: $6.90

Energy Charge:
First 200 KWH @ 5.3¢
Next 400 KWH @ 4.7¢
Next 600 KWH @ 3.7¢
All Add'l KWH @ 4.1¢

Use the rate schedule and fill in the chart, then graph.

# of KWH Used	Total Cost



VI. Graph the information you collect from the members of the class about the telephone. You may graph any information you want. Be sure to fill in a table of values.

IV. Family Finances

A. Budgeting the Family Income

1. Objectives

a. Calculates the amount spent and/or percentage of total income spent on budget items.

b. Constructs and interprets bar, line and circle graphs.

c. Measures angles with protractor.

2. Comments

Graphs of all types are seen daily in magazines and newspapers. Students should acquire some knowledge of graphs and be able to interpret them. Some of the skills that students should already have are finding what percent one number is of another and finding the percent of a number. Also, before working on the circle graphs, time should be spent in using a protractor to measure and draw angles.

3. Activities

a. ARITHMETIC SKILLS WORKBOOK,
pp. 317-321, interpreting line and bar graphs.

b. ARITHMETIC SKILLS WORKBOOK,
pp. 321-323, construction of a circle graph.

c. Circle Graphs (pg. 115). Given an inc me and amount spent on items, compute the percent and construct a circle graph.

d. Bar Graphs (pg. 117). Given the percent of income spent on items, find the amount spent and construct a bar graph.

e. ARITHMETIC SKILLS WORKBOOK, pp. 184-186, finding what percent one number is of another.

f. MATHEMATICS FOR DAILY USE,
pp. 66-69, line graphs.
pp. 74-76, bar graphs.
pp. 78-81, circle graphs.

g. REFRESHER MATHEMATICS,
pp. 240-245, finding the percent.
pp. 338-342, measuring angles.
pp. 523-525, graphs.

Applications B
Family Finances
Activity IV A-3.c.
Circle Graphs

Name _____

Date _____ Pd. _____

Score _____

Shown below is a sample budget of a local family.

Estimated net income per month:

Husband's job	$ 750.00	
Wife's job	750.00	
Total income		$1,500.00

Approximate spending for one month

Food	$ 300.00	
Housing	600.00	
Clothing	150.00	
Medical Care	50.00	
Insurance	80.00	
Savings	120.00	
Miscellaneous	200.00	
Total Expenditures		$1,500.00

1. Compute the percent of the total income spent on each of the following.

Item	Percent of Total Income
Food	20% $\frac{300}{1500} = \frac{1}{5} = 20\%$
Housing	_____
Clothing	_____
Medical Care	_____
Insurance	_____
Savings	_____
Miscellaneous	_____

2. The total number of degrees around a circle is 360. Find the number of degrees in the central angle for each expenditure.

Item	Measure of Central Angle
Food	_____
Housing	_____
Clothing	_____
Medical Care	_____
Insurance	_____
Savings	_____
Miscellaneous	_____

3. Use the information in exercise #2 to construct a circle graph of the expenditures. Use a protractor.

Applications B
Family Finances
Activity IV A-3.d.
Bar Graphs

Name _____

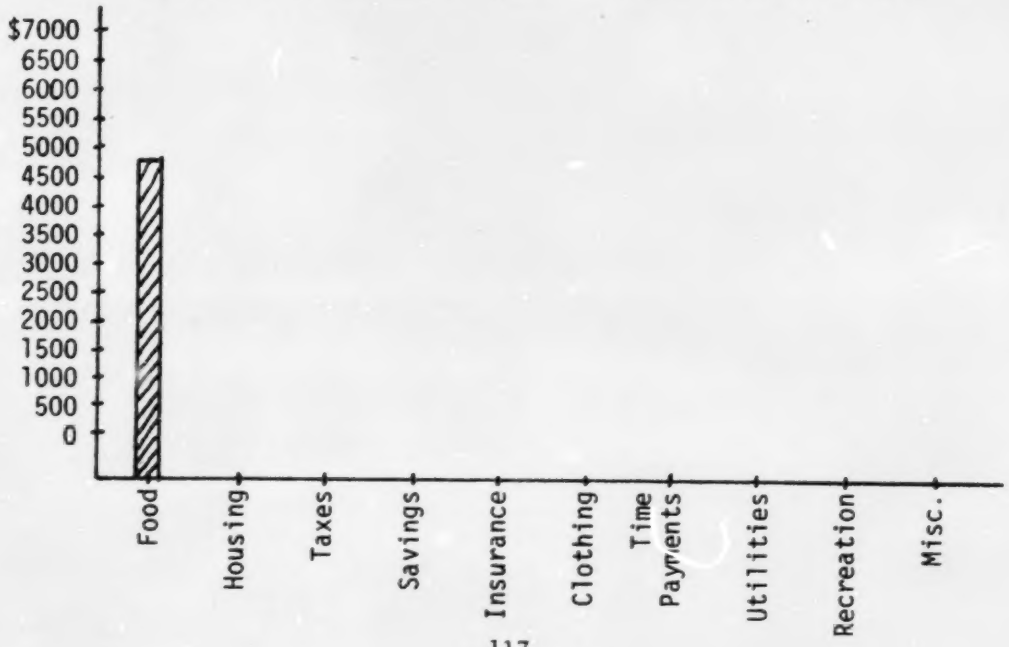
Date _____ Pd. _____

Score _____

1. Listed below is a budget distribution for an income of $24,000 a year. Compute the amount of money spent on each item.

Budget Item	Amount Spent	
20% Food	$4,800	20% of $24,000 = .20 x 24,000= $4,800
10% Housing	_____	
29% Taxes	_____	
6% Savings	_____	
12% Insurance	_____	
4% Clothing	_____	
9% Time Payments	_____	
2% Utilities	_____	
4% Recreation	_____	
4% Miscellaneous	_____	

2. Complete the bar graph below using your answers to exercise #1.



IV. Family Finances

B. Checking and Savings Accounts

1. Checking Accounts

a. Objectives

1) Completes an application for a checking account.

2) Completes a deposit slip.

3) Writes a check.

4) Records transactions and keeps a current balance in the check register.

5) Adds and subtracts integers.

6) Reconciles a bank statement.

b. Comments

A checking account is a must in this age. Students should acquire the necessary skills for getting and maintaining an account. Students should have the necessary arithmetic skills. You may want to go into the advantages of the Passcard Payment or Plus Banking services that are available. Forms are available through banks and other financial institutions. Be careful when you reproduce a check form. Have "SAMPLE" printed on the check.

c. Activities

1) Filing out a deposit slip.
CONSUMER AND CAREER MATHEMATICS,
pp. 88-89, deposit slips.
CONSUMER MATHEMATICS,
pp. 304-305.

2) Writing a check and recording it.
CONSUMER AND CAREER MATHEMATICS,
pp. 90-91, checks and check stubs.
CONSUMER MATHEMATICS,
pp. 306-311.

3) Keeping a current balance on the register.
CONSUMER AND CAREER MATHEMATICS,
pp. 92-94, check registers.

4) Reconciling a bank statement.
CONSUMER AND CAREER MATHEMATICS,
pp. 94-96, reconciling accounts.
p. 97, calculator activity on register.
CONSUMER MATHEMATICS,
pp. 312-316, reconciling an account.

5) Find a Balance for Mrs. Lolo (pg.121).

6) ARITHMETIC SKILLS WORKBOOK,
pp. 262-266, deposit slips.
pp. 266-269, checks and check stubs.
pp. 269-277, reconciling an account.

7) Students should have more exercises on finding errors in keeping the register and correcting the errors.

2. Savings Accounts

a. Objectives

1) Completes an application for a savings accounts.

2) Completes a savings deposit and withdrawal slip.

3) Computes amount of savings of total income.

4) Computes simple interest.

5) Computes compound interest from formula and table.

b. Comments

Forms are available at banks and other financial institutions. Ask your bank for any information packets on the services that are available.

c. Activities

1) Given a percent of your income that you want to save, find the amount that has to be saved. This exercise is a carry over from the budget unit.
CONSUMER MATHEMATICS,
pp. 284-285, savings plans.
pp. 300-302, institutions and services.

2) Computes simple interest.
CONSUMER MATHEMATICS,
pp. 286-291, simple interest, daily interest factor, and day-of-withdrawal accounts.

3) Computes compound interest.
CONSUMER MATHEMATICS,
pp. 292-294, use of the formula, $A=p(1+r)^n$.
pp. 295-299, use of table.
CONSUMER AND CAREER MATHEMATICS,
pp. 100-101, use of the formula, $I=prt$.
pp. 102-103, use of table.

4) ARITHMETIC SKILLS WORKBOOK,
pp. 311-314, computing compound interest using a table.

5) REFRESHER MATHEMATICS,
pp. 572-575, computing simple interest.
pp. 577-581, using tables for compound interest.

Applications B
Family Finances
Activity IV B-1.c.5
Find a Balance for Mrs. LoLo

Name_____

Date_____ Pd._____

Mrs. LoLo has her own system of keeping her check register. She records all deposits using a + sign and all checks she writes she uses a - sign. She keeps record of what happens to her account but she never figures out her balance until the end of the month. The following is Mrs. LoLo's record for the month. Fill in her balance for her in the column provided.

Date	Amount	Source	Balance $5.04
June 1	+ 500.45	GoGet'Em	
4	- 50.40	Longs	
5	- 400.46	mortgage	
7	+ 250.00	rental	
9	- 316.75	Liberty House	
10	- 23.75	groceries	
13	+ 70.00	loan	
15	- 65.00	groceries	
17	- 25.43	Liberty House	
20	- 13.75	telephone	
21	- 45.85	electricity	
22	- 10.00	water	
26	+ 110.00	Jack Pot	
29	+ 175.14	refund	
30	- 6.06	juice	
	- 25.76	property tax	

1. How much does Mrs. LoLo have in her account at the end of June?

2. One June 9, her balance is -$12.12. What does this mean?

3. How much money does Mrs. LoLo have in her account on June 10?

4. What is the total deposits for the month?

5. What is the total amount she spent for the month?

6. What is the difference between the amounts for #4 and #5?

7. Did Mrs. LoLo spend more than she deposited to her account on June 21?
   If so, how much?

8. How does the figure in #6 compare to her balance at the end of the month?

9. Did Mrs. LoLo spend more than she deposited to her account?
   If so, how much?

10. How much did she spend on utilities?

11. How much is her mortgage payment?

12. How much did Mrs. LoLo spend at Liberty House?

13. What was the total amount spent on groceries for the month?

14. In your opinion, does Mrs. LoLo have a good system of keeping her register?
    Explain.

IV. Family Finances

C. Using Credit Cards

1. Objectives

a. Completes an application to obtain a credit card.

b. Reads a monthly statement for a credit card account.

c. Computes finance charges.

2. Comments

Many department stores and financial institutions issue credit cards or charge cards and most people find them a convenience for a number of reasons and generally, have three or more different cards. As potential credit card holders, students should be made aware of their uses and abuses.

3. Activities

a. Conduct a discussion with the students pointing out the pros and cons of credit cards.

b. Complete sample copies of credit card application forms obtained from various stores and banks. It may be wise to stamp the forms stating that they are SAMPLES to keep them from being used incorrectly.

c. MATHEMATICS IN MODULES CM4 CONSUMER MATHEMATICS, pp. 64-72, definitions of terms, methods of computing finance charges.

d. Computing Finance Charges (pg.124).

e. CONSUMER MATHEMATICS, pp. 271-277, computing finance charges and balances on monthly purchases.

f. CONSUMER RELATED MATHEMATICS, pp. 214-216, finding balances on monthly statements.

Applications B
Family Finances
Activity IV C-3.d.
Computing Finance Charges

Name_____

Date_____ Pd._____

Score_____

Mr. and Mrs. X. Chong had the following record on their Bank charge account. Complete the table. Use a calculator.

Month	Balance	Payment	New Amount	1.5% Finance Charge	New Balance	Add'l Charges
Jan	$ 250.00	$150.00	$100.00	$1.50	$ 101.50	$ 33.25
Feb	134.75	134.75				462.73
Mar		200.00				52.04
Apr		118.71				84.92
May		150.00				-0-
June		36.97				255.62
July		150.00				40.00
Aug			-0-			76.70
Sept			-0-			362.00
Oct		150.00				33.94
Nov		150.00				48.00
Dec			-0-			263.43

Answer the following questions by using the above table.

1. What is the total finance charges for the year?

2. What is the total amount purchased during the year?

2. What is the total amount paid during the year?

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APPENDIX A*

test Suggested Minimum Competency Test

This test is designed to measure how well students can use mathematics in everyday life. It is an example of the type of minimum competency test that many schools require for graduation. There are 66 questions that test the consumer topics listed below. The three test items that test each topic are also given.

Topic		Test items
1	Gross pay	1, 2, 3
2	Net pay	4, 5, 6
3	Income tax	7, 8, 9
4	Totaling expenses	10, 11, 12
5	Sales tax	13, 14, 15
6	Sales discounts	16, 17, 18
7	Making change	19, 20, 21
8	Unit cost comparison	22, 23, 24
9	Bank deposits	25, 26, 27
10	Check register	28, 29, 30
11	Interest	31, 32, 33
12	Monthly payments and finance charges	34, 35, 36
13	Averages	37, 38, 39
14	Budgeting	40, 41, 42
15	Road map distances	43, 44, 45
16	Travel time	46, 47, 48
17	Insurance	49, 50, 51
18	Measurements for home projects	52, 53, 54
19	Area	55, 56, 57
20	Time calculations	58, 59, 60
21	Reading graphs	61, 62, 63
22	Using charts and tables	64, 65, 66

When administering this test, you can have students mark their answers on the test itself, or on a separate sheet. Students will need extra paper for computing answers. Allow students as much time as necessary to complete the test.

Answers for scoring the test are given below. Interpretation of test scores is left up to individual teachers. You can set a percent-correct standard that you feel would reflect competence for your students. Or, you could make an analysis for each student of topics in which more than one test item is answered incorrectly.

Answers

1. D	19. A	37. B	55. C
2. C	20. A	38. D	56. D
3. C	21. B	39. A	57. C
4. B	22. D	40. D	58. C
5. A	23. C	41. A	59. A
6. A	24. C	42. C	60. B
7. D	25. D	43. B	61. A
8. A	26. C	44. B	62. B
9. C	27. B	45. A	63. A
10. D	28. A	46. B	64. D
11. C	29. C	47. C	65. B
12. B	30. A	48. B	66. C
13. C	31. A	49. A	
14. D	32. B	50. B	
15. C	33. A	51. A	
16. B	34. B	52. C	
17. B	35. A	53. C	
18. B	36. B	54. A	

*CONSUMER AND CAREER MATHEMATICS, Scott, Foresman and Company, pages \$41-48 in the Comments to the Teachers.

T 41

Choose the best answer.

1. If you make $800 per month, what is your annual gross pay?

   A $4800 C $8400

   B $8000 D $9600

2. Mike earns $140 per week. What is his annual salary?

   A $1680 C $7280

   B $7000 D $14,000

3. You are paid $4.75 per hour. What is your gross pay for a 40-hour week?

   A $23.75 C $190

   B $57.00 D $247

4. Joe's gross pay is $880 per month. $140 is deducted from his monthly paycheck. What is his net pay after deductions?

   A $640 C $840

   B $740 D $1020

5. Here is Dale's paycheck stub. What is her net pay after deductions?

Gross pay	$160.00	
Deductions	FICA $10.00	Federal income tax $25.00

   A $125 C $150

   B $135 D $195

6. Your gross pay is $150. Your deductions are $20 for income tax, $9 for FICA, and $2 for insurance. What is your net pay after deductions?

   A $119 C $150

   B $121 D $181

7. Sara earned $7060 in wages, $45 in interest, and $1095 in tips. What is her total income?

   A $7105 C $8155

   B $8090 D $8200

8. Jon is figuring his income tax. His total tax is $785. His employer has withheld $800. What will happen?

   A He will receive a $15 refund.

   B He should pay $15.

   C He should pay $800.

   D He will receive a $785 refund.

9. You are allowed a $750 deduction from your income for each exemption on your income tax return. If you have 2 exemptions, what is your deduction?

   A $750 C $1500

   B $752 D $2250

10. What is the total cost of 5 tires priced at $45 each?

    A $9 C $175

    B $50 D $225

11. Hans bought a shirt for $15.75, 2 pairs of jeans at $22.50 a pair, and a belt for $6.50. What was the total cost?

    A $44.75 C $67.25

    B $66.25 D $67.75

12. Notebooks cost $.75 each. Pencils cost $.07 each. What is the total cost of 3 notebooks and 4 pencils?

    A $2.25 C $3.21

    B $2.53 D $5.25

Go on to the next page.

13. If the sales tax in your state is 4%, what will be the tax on a $20 radio?

A $.08 C $.80

B $.50 D $8.00

14. Wentworth buys a $5 tie and a $15 sweater. If state sales tax is 6%, what is the tax on his purchase?

A $.12 C $.90

B $.30 D $1.20

15. The price of a used car is $500. The sales tax is 5%. What is the total cost of the car, including tax?

A $502.50 C $525.00

B $510.00 D $750.00

16. A $10.00 book is on sale at 20% off. How much is the discount?

A $.20 C $5

B $2 D $8

17. What is the sale price of a jacket?

Jacket Sale
Regular price – $16
Now 25% off

A $4.00 C $15.75

B $12.00 D $16.00

18. Which is the lowest sale price?

A $4.50 less 10% discount

B $5.00 less 20% discount

C $6.00 less 30% discount

D $7.00 less 40% discount

19. Mary's lunch cost $3.17. She gave the cashier $5.00. What is her change?

A $1.83 C $2.83

B $1.93 D $2.93

20. Art bought an 8-track tape for $8.88. He gave the clerk a ten-dollar bill. How much change should he receive?

A 1 dollar, 1 dime, and 2 pennies

B 1 dollar, 2 dimes, and 2 pennies

C 3 quarters, 1 dime, and 2 pennies

D 2 dollars, 2 nickels, and 2 pennies

21. If you buy a suit for $46.80 and give the clerk $50, how much change should you receive?

A $3.02 C $4.20

B $3.20 D $4.80

22. Which is the lowest price per can?

A 4 for $1 C $.30 each

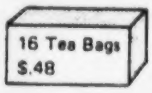
B 3 for $.90 D 5 for $1.20

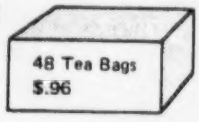
23. Which is the lowest price per kilogram?

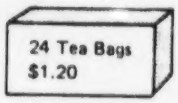
A 1 kg for $20 C 2.5 kg for $35

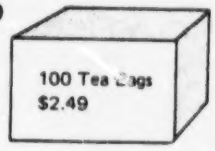
B 1.5 kg for $30 D 3 kg for $50

24. Which box costs the least per tea bag?

A


C


B


D


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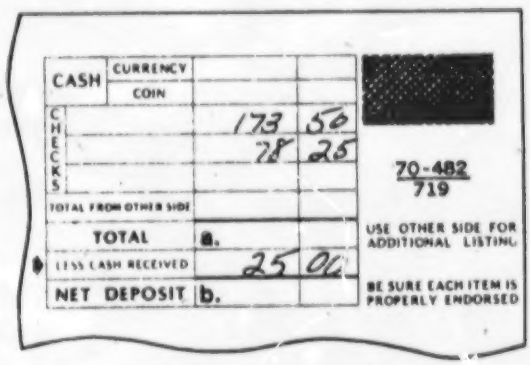
Test page 2. This page may be reproduced. T 43

Part of a bank deposit slip is shown here. Use it to answer questions 25 and 26.



25. What amount belongs in space **a**?

A $95.25 C $141.75

B $105.35 D $251.75

26. What amount belongs in space **b**?

A $70.25 C $226.75

B $120.25 D $276.75

27. Chuck deposited checks for $14.75, $15.00, and $12.50. What was his total deposit?

A $32.25 C $42.75

B $42.25 D $52.25

Use this check register to answer questions 28 and 29.

CHECK NO.	DATE	DESCRIPTION	AMOUNT OF CHECK	✓	AMOUNT OF DEPOSIT	BALANCE
						103 60
275	8/25	AAA Hardware	63 30			40 30
276	8/27	Dr. M. Wong	25 00			a.
	8/31	Paycheck			175 70	b.

28. What amount belongs in space **a**?

A $15.30 C $65.30

B $38.30 D $143.90

29. What amount belongs in space **b**?

A $56.50 C $191.00

B $159.20 D $334.90

30. You have a balance of $55.20 in your check register. If you record a check for $23.10, what will be the new balance?

A $32.10 C $78.30

B $32.30 D $79.30

Go on to the next page.

31. Bill bought a U.S. Series E Savings Bond for $18.75. After 5 years the bond is worth $25. How much interest has he earned?

A $6.25 C $18.75

B $7.25 D $25.00

32. You borrow $500 for one year at an annual interest rate of 11%. How much interest will you owe for one year?

A $550 C $5.50

B $55 D $.55

33. Li borrowed $1000 for one year at an annual interest rate of 18%. What was her total amount due (both principal and interest) at the end of the year?

A $1180 C $1810

B $1018 D $1800

34. Brad is paying for a motor in equal monthly payments for one year. The total cost is $480. How much will he pay each month?

A $4 C $48

B $40 D $80

35. Ann is paying for a stereo with 18 equal monthly payments. The stereo costs $480. The finance charge is $60. What is the total monthly payment?

A $30 C $420

B $45 D $540

36. Gordon bought furniture costing $2000. He paid $100 per month for 24 months. What was the finance charge?

A $100 C $2000

B $400 D $2400

37. In the last four months, Judy has spent $104, $95, $106, and $115 on food. What is her average monthly food cost?

A $100 C $115

B $105 D $420

38. Shirley bowls on a team. Last night in 3 games she bowled 123, 137, and 145. What was her average score?

A 406 C 137

B 405 D 135

39. Virgil's annual income for the last 5 years has been: $9500, $10,000, $11,000, $12,250, and $12,500. What is his average annual income?

A $11,050 C $10,000

B $11,000 D $12,250

40. Allen wants to save a certain amount each month so that he will have $720 in one year. How much should he save each month?

A $7.20 C $50

B $14 D $60

41. Once a year Seiko pays $260 for life insurance. How much should she budget each week for this insurance?

A $5 C $20

B $10 D $26

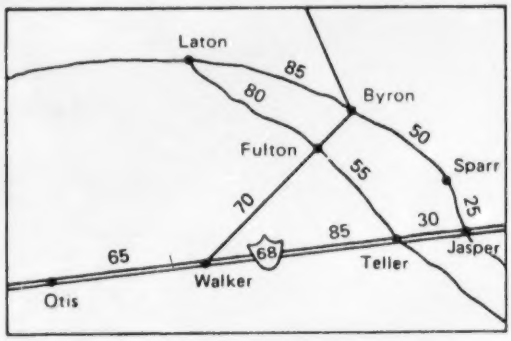
42. How much should you save from your paycheck each month to save a total of $600 in one year?

A $5 C $50

B $20 D $60

Go on to the next page.

The distances on this map are given in kilometers. Use the map to answer questions 43 through 47.



43. What is the distance from Jasper to Walker on Interstate 68?

A 98 km **C** 153 km

B 115 km **D** 183 km

44. What is the distance from Laton to Jasper by the shortest route?

A 155 km **C** 165 km

B 160 km **D** 175 km

45. If the distance from Byron to Walker is 90 km, how far is it from Byron to Fulton?

A 20 km **C** 70 km

B 35 km **D** 90 km

46. Paula is driving from Otis to Teller on Interstate 68. Her average speed is 75 km/h. How long will the trip take?

A 1 hour **C** 2.5 hours

B 2 hours **D** 3 hours

47. You average 80 km/h from Laton to Fulton and 70 km/h from Fulton to Walker. How long will it take you to drive from Laton to Walker?

A 1 hour **C** 2 hours

B 1.5 hours **D** 2.5 hours

48. You are driving 420 km. Your average speed is 70 km/h. How long will the trip take?

A 5 hours **C** 10 hours

B 6 hours **D** 60 hours

49. May's auto insurance costs $90 for bodily injury coverage, $60 for property damage coverage, and $110 for collision coverage. What is her annual insurance premium?

A $260 **C** $170

B $200 **D** $150

50. Mel has $100-deductible collision insurance on his car. He had an accident costing $345 to repair. How much will be paid by insurance?.

A $100 **C** $345

B $245 **D** $445

51. Ina has a $50-deductible health insurance policy which pays 80% of the amount after the deductible. On a $550 hospital bill, how much will be paid by insurance?

A $400 **C** $500

B $440 **D** $550

Go on to the next page.

52. One recipe calls for $2\frac{1}{2}$ cups of flour. Another calls for $2\frac{1}{4}$ cups of flour. How much flour is needed to make both recipes?

A $4\frac{1}{4}$ cups
C $4\frac{3}{4}$ cups
B $4\frac{1}{2}$ cups
D 5 cups

53. Gale needs $\frac{1}{2}$ yard of fabric for a vest, $1\frac{1}{4}$ yards for a skirt, and $2\frac{1}{8}$ yards for a jacket. How many yards of fabric must she buy?

A $3\frac{3}{8}$ yards
C $3\frac{7}{8}$ yards
B $3\frac{3}{4}$ yards
D 4 yards

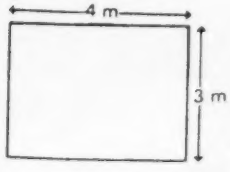
54. Sam has two 4-liter cans of paint. He needs 2.5 liters to paint one room and 3.7 liters to paint another room. How much paint will he have left over?

A 1.8 liters
C 5.2 liters
B 2.8 liters
D 6.2 liters

55. A wall is $12\frac{1}{2}$ feet long and 8 feet high. What is the area of the wall?

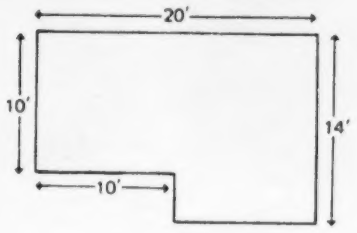
A $20\frac{1}{2}$ sq. ft.
C 100 sq. ft.
B 96 sq. ft.
D 200 sq. ft.

56. Carpet costs $15 per square meter installed. How much will it cost to carpet this room?



A $105
C $150
B $130
D $180

57. How much floor covering would you need to cover this floor?



A 140 sq. ft.
C 240 sq. ft.
B 200 sq. ft.
D 280 sq. ft.

58. Your car was parked in the parking lot from 8:45 A.M. until 9:10 P.M. How long was the car parked?

A 25 minutes
B 11 hours 35 minutes
C 12 hours 25 minutes
D Almost 24 hours

59. A concert ends at 11:10 P.M. It takes you 45 minutes to drive home. What time will you be home?

A 11:55 P.M.
C 12:05 A.M.
B 11:55 A.M.
D 12:20 A.M.

60. Jim will leave at 8:15 A.M. and drive for 3 hours 15 minutes. When will he arrive?

A 11:15 A.M.
C 12:15 P.M.
B 11:30 A.M.
D 12:30 P.M.

Go on to the next page.

Use this graph to answer questions 61 through 63.

Number of Transistor Radios Produced

61. In which year were the most transistor radios produced?

A 1973 **C** 1975

B 1974 **D** 1976

62. About how many radios were made in 1976?

A 15 million **C** 20 million

B 18 million **D** 21 million

63. Which year had the biggest increase in radio production from the previous year?

A 1973 **C** 1976

B 1974 **D** 1977

Use this distance chart to answer questions 64 through 66. The distance in kilometers between two cities is given by the number in the row for one city that is in the column for the other city.

	Dallas	Denver	Fargo	Los Angeles
Chicago	1510	1642	1060	3397
Dallas		1265	1730	2274
Denver	1265		1453	1874
Fargo	1790	1453		3121
Memphis	755	1706	1711	2940
New Orleans	806	2071	2385	3090
Phoenix	1647	1332	2784	627
Portland	3318	2073	2565	1603
St. Louis	1050	1392	1310	3003

64. What is the distance between Memphis and Denver?

A 755 km **C** 1642 km

B 1453 km **D** 1706 km

65. If you make a trip from St. Louis to Fargo to Dallas, what will be your total distance traveled?

A 2360 km **C** 3870 km

B 3100 km **D** 4150 km

66. Which two cities are the greatest distance apart?

A Chicago and Dallas

B Fargo and Denver

C St. Louis and Los Angeles

D Phoenix and Fargo

Stop. End of test.

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